

## Pflichtmodule

### GEO.07405.01 - Abschlussmodul Masterarbeit (Angewandte Geowissenschaften)

|                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                     |
|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| GEO.07405.01                                               | 30 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                     |
| Module label                                               | Abschlussmodul Masterarbeit (Angewandte Geowissenschaften)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |
| Module code                                                | GEO.07405.01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                     |
| Semester of first implementation                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                     |
| Module used in courses of study / semesters                | <ul style="list-style-type: none"> <li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Pflichtmodule</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                     |
| Responsible person for this module                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                     |
| Further responsible persons                                | Prüfungsausschussvorsitz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                     |
| Prerequisites                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                     |
| Skills to be acquired in this module                       | <ul style="list-style-type: none"> <li>Die Studierenden erwerben und belegen die Kompetenz, selbstständig und eigenverantwortlich eine Fragestellung aus dem Bereich der Angewandten Geowissenschaften zu präzisieren, diese mit wissenschaftlichen Methoden empirisch und/oder theoretisch zu bearbeiten und eine erste eigenständige Forschungsleistung vorzuweisen.</li> </ul> <p>Die Studierenden sind in der Lage, eine wissenschaftliche Fragestellung aus den Fachgebieten der Geodynamik, der Mineralogie und Geochemie, der Petrologie und Lagerstättenkunde sowie der Angewandten Geologie fachlich umfassend mit Erhebung eigener Datensätze darzustellen, entsprechende Literatur auszuwerten und die kritisch zu beleuchten und kritisch zu interpretieren.</p> <ul style="list-style-type: none"> <li>Dazu weisen die Studierenden nach, dass sie selbstständig umfassende Recherchen und Versuche zu einer wissenschaftlichen Fragestellung durchführen können und in der Lage sind, die Ergebnisse kritisch zu würdigen und vergleichend zu analysieren sowie einen eigenen Standpunkt zu entwickeln, präzise zu formulieren und schlüssig zu begründen. Hierbei wird ebenfalls die Fähigkeit zu einem realistischen Zeitmanagement hinsichtlich der einzelnen Arbeitsschritte bis zur Abfassung der schriftlichen Arbeit nachgewiesen.</li> </ul> |                     |
| Module contents                                            | <ul style="list-style-type: none"> <li>Selbstständige Bearbeitung einer geowissenschaftlichen Fragestellung, die sich inhaltlich an den Forschungsschwerpunkten der jeweiligen Lehrstühle orientieren.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                     |
| Form of instruction                                        | Independent supervised work                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                     |
| Languages of instruction                                   | German, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                     |
| Duration (semesters)                                       | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     |
| Module frequency                                           | jedes Sommersemester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                     |
| Module capacity                                            | unrestricted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                     |
| Time of examination                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                     |
| Credit points                                              | 30 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                     |
| Share on module final degree                               | Course 1: %.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                     |
| Share of module grade on the course of study's final grade | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                     |
| Examination                                                | Exam prerequisites                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Type of examination |
| Course 1                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                     |
| Final exam of module                                       | Masterarbeit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                     |

| Examination                                          | Exam prerequisites                  | Type of examination |
|------------------------------------------------------|-------------------------------------|---------------------|
| <b>Exam repetition information</b>                   |                                     |                     |
| <b>Form of instruction</b>                           | Independent supervised work         |                     |
| <b>Course name</b>                                   | Wissenschaftliche Arbeit (6 Monate) |                     |
| <b>SWS</b>                                           |                                     |                     |
| <b>Workload of compulsory attendance</b>             |                                     |                     |
| <b>Workload of preparation / homework etc</b>        |                                     |                     |
| <b>Workload of independent learning</b>              |                                     |                     |
| <b>Workload (examination and preparation)</b>        |                                     |                     |
| <b>Workload total</b>                                | 0                                   |                     |
| <b>Workload self-arranged work (module-oriented)</b> | 900                                 |                     |
| <b>Total module workload</b>                         | 900                                 |                     |
| <b>Type of examination</b>                           |                                     |                     |
| <b>Frequency</b>                                     | Summer semester                     |                     |
| <b>Capacity</b>                                      | unrestricted                        |                     |

## Wahlpflichtmodule Geowissenschaftlicher Kernbereich

### GEO.07407.01 - Orientation module: overview of research activities in applied geosciences

|                                                            |             |               |                    |                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        |              |
|------------------------------------------------------------|-------------|---------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| GEO.07407.01                                               |             |               |                    | 5 CP                                                                                                                                                                                                                                                                             |                                        |                                  |                                        |              |
| Module label                                               |             |               |                    | Orientation module: overview of research activities in applied geosciences                                                                                                                                                                                                       |                                        |                                  |                                        |              |
| Module code                                                |             |               |                    | GEO.07407.01                                                                                                                                                                                                                                                                     |                                        |                                  |                                        |              |
| Semester of first implementation                           |             |               |                    |                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        |              |
| Module used in courses of study / semesters                |             |               |                    | <ul style="list-style-type: none"><li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Wahlpflichtmodule Geowissenschaftlicher Kernbereich</li></ul> |                                        |                                  |                                        |              |
| Responsible person for this module                         |             |               |                    |                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        |              |
| Further responsible persons                                |             |               |                    | Prüfungsausschussvorsitz                                                                                                                                                                                                                                                         |                                        |                                  |                                        |              |
| Prerequisites                                              |             |               |                    |                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        |              |
| Skills to be acquired in this module                       |             |               |                    | <ul style="list-style-type: none"><li>Förderung der Fähigkeit, die verschiedenen Forschungsthemen und -felder der "Angewandten Geowissenschaften" zu identifizieren, zu analysieren und in ihrer Verknüpfung zu verstehen.</li></ul>                                             |                                        |                                  |                                        |              |
| Module contents                                            |             |               |                    | <ul style="list-style-type: none"><li>Darstellung von interdisziplinär relevanten Fragestellungen mit Beispielen aus aktuellen Forschungsaktivitäten der "Angewandten Geowissenschaften"</li></ul>                                                                               |                                        |                                  |                                        |              |
| Forms of instruction                                       |             |               |                    | Colloquium (1 SWS)<br>Lecture (2 SWS)<br>Course                                                                                                                                                                                                                                  |                                        |                                  |                                        |              |
| Languages of instruction                                   |             |               |                    | German, English                                                                                                                                                                                                                                                                  |                                        |                                  |                                        |              |
| Duration (semesters)                                       |             |               |                    | 1 Semester Semester                                                                                                                                                                                                                                                              |                                        |                                  |                                        |              |
| Module frequency                                           |             |               |                    | jedes Wintersemester                                                                                                                                                                                                                                                             |                                        |                                  |                                        |              |
| Module capacity                                            |             |               |                    | unrestricted                                                                                                                                                                                                                                                                     |                                        |                                  |                                        |              |
| Time of examination                                        |             |               |                    |                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        |              |
| Credit points                                              |             |               |                    | 5 CP                                                                                                                                                                                                                                                                             |                                        |                                  |                                        |              |
| Share on module final degree                               |             |               |                    | Course 1: %; Course 2: %; Course 3: %.                                                                                                                                                                                                                                           |                                        |                                  |                                        |              |
| Share of module grade on the course of study's final grade |             |               |                    | 1                                                                                                                                                                                                                                                                                |                                        |                                  |                                        |              |
| Examination                                                |             |               | Exam prerequisites |                                                                                                                                                                                                                                                                                  | Type of examination                    |                                  |                                        |              |
| Course 1                                                   |             |               |                    |                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        |              |
| Course 2                                                   |             |               |                    |                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        |              |
| Course 3                                                   |             |               |                    |                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        |              |
| Final exam of module                                       |             |               | Referat            |                                                                                                                                                                                                                                                                                  |                                        | Projektarbeitsbericht            |                                        |              |
| Exam repetition information                                |             |               |                    |                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        |              |
| Module course label                                        | Course type | Course title  | SWS                | Workload of compulsory attendance                                                                                                                                                                                                                                                | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| Course 1                                                   | Colloquium  | Kolloquium    | 1                  |                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        | 0            |
| Course 2                                                   | Lecture     | Vorlesung     | 2                  |                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        | 0            |
| Course 3                                                   | Course      | Selbststudium |                    |                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        | 0            |
| Workload by module                                         |             |               |                    |                                                                                                                                                                                                                                                                                  |                                        | 150                              |                                        | 150          |
| Total module workload                                      |             |               |                    |                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        | 150          |

## GEO.07406.01 - Internship Master

|                                                            |                                                                                                                                                                                                                                                                                                                                                      |                     |
|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| GEO.07406.01                                               |                                                                                                                                                                                                                                                                                                                                                      | 10 CP               |
| Module label                                               | Internship Master                                                                                                                                                                                                                                                                                                                                    |                     |
| Module code                                                | GEO.07406.01                                                                                                                                                                                                                                                                                                                                         |                     |
| Semester of first implementation                           |                                                                                                                                                                                                                                                                                                                                                      |                     |
| Module used in courses of study / semesters                | <ul style="list-style-type: none"> <li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Wahlpflichtmodule Geowissenschaftlicher Kernbereich</li> </ul>                                                                   |                     |
| Responsible person for this module                         |                                                                                                                                                                                                                                                                                                                                                      |                     |
| Further responsible persons                                | Prüfungsausschussvorsitz                                                                                                                                                                                                                                                                                                                             |                     |
| Prerequisites                                              |                                                                                                                                                                                                                                                                                                                                                      |                     |
| Skills to be acquired in this module                       | <ul style="list-style-type: none"> <li>Die Studierenden entwickeln die Fähigkeit zur Eingliederung in praktische Arbeitsabläufe einer geowissenschaftlichen Firma außerhalb der Martin-Luther-Universität Halle-Wittenberg.</li> <li>Sie wenden erlerntes Wissen in der Praxis an und reflektieren den Bezug zwischen Theorie und Praxis.</li> </ul> |                     |
| Module contents                                            | <ul style="list-style-type: none"> <li>Ausübung geowissenschaftlicher Tätigkeiten, Geländearbeiten, Datenauswertung und Präsentation</li> </ul>                                                                                                                                                                                                      |                     |
| Form of instruction                                        | Course                                                                                                                                                                                                                                                                                                                                               |                     |
| Languages of instruction                                   | German, English                                                                                                                                                                                                                                                                                                                                      |                     |
| Duration (semesters)                                       | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                  |                     |
| Module frequency                                           | jedes Semester                                                                                                                                                                                                                                                                                                                                       |                     |
| Module capacity                                            | unrestricted                                                                                                                                                                                                                                                                                                                                         |                     |
| Time of examination                                        |                                                                                                                                                                                                                                                                                                                                                      |                     |
| Credit points                                              | 10 CP                                                                                                                                                                                                                                                                                                                                                |                     |
| Share on module final degree                               | Course 1: %.                                                                                                                                                                                                                                                                                                                                         |                     |
| Share of module grade on the course of study's final grade | 1                                                                                                                                                                                                                                                                                                                                                    |                     |
| Examination                                                | Exam prerequisites                                                                                                                                                                                                                                                                                                                                   | Type of examination |
| Course 1                                                   |                                                                                                                                                                                                                                                                                                                                                      |                     |
| Final exam of module                                       | Nachweis der Ableistung des Praktikums, Praktikumsbericht                                                                                                                                                                                                                                                                                            |                     |
| Exam repetition information                                |                                                                                                                                                                                                                                                                                                                                                      |                     |
| Form of instruction                                        | Course                                                                                                                                                                                                                                                                                                                                               |                     |
| Course name                                                | Betriebspraktikum ( min. 8 Wochen)                                                                                                                                                                                                                                                                                                                   |                     |
| SWS                                                        |                                                                                                                                                                                                                                                                                                                                                      |                     |
| Workload of compulsory attendance                          |                                                                                                                                                                                                                                                                                                                                                      |                     |
| Workload of preparation / homework etc                     |                                                                                                                                                                                                                                                                                                                                                      |                     |
| Workload of independent learning                           |                                                                                                                                                                                                                                                                                                                                                      |                     |
| Workload (examination and preparation)                     |                                                                                                                                                                                                                                                                                                                                                      |                     |
| Workload total                                             | 0                                                                                                                                                                                                                                                                                                                                                    |                     |
| Workload self-arranged work (module-oriented)              | 300                                                                                                                                                                                                                                                                                                                                                  |                     |
| Total module workload                                      | 300                                                                                                                                                                                                                                                                                                                                                  |                     |
| Type of examination                                        |                                                                                                                                                                                                                                                                                                                                                      |                     |
| Frequency                                                  | Summer or winter semester                                                                                                                                                                                                                                                                                                                            |                     |

Capacity

unrestricted

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# Geodynamik

## GEO.07398.01 - Geochronology

|                                                            |             |              |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |                                  |                                        |              |
|------------------------------------------------------------|-------------|--------------|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| GEO.07398.01                                               |             |              |                                             | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |
| Module label                                               |             |              |                                             | Geochronology                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                                  |                                        |              |
| Module code                                                |             |              |                                             | GEO.07398.01                                                                                                                                                                                                                                                                                                                                                                                                                                |                                        |                                  |                                        |              |
| Semester of first implementation                           |             |              |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |                                  |                                        |              |
| Module used in courses of study / semesters                |             |              |                                             | <ul style="list-style-type: none"><li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Geodynamik</li></ul>                                                                                                                                                                                                     |                                        |                                  |                                        |              |
| Responsible person for this module                         |             |              |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |                                  |                                        |              |
| Further responsible persons                                |             |              |                                             | Dr. S. Schnapperelle                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |
| Prerequisites                                              |             |              |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |                                  |                                        |              |
| Skills to be acquired in this module                       |             |              |                                             | <ul style="list-style-type: none"><li>Studierende verstehen und erläutern die Grundlagen radiometrischer geochronologischer Methoden und entwickeln ein Verständnis der theoretischen Grundlagen der Maassenspektrometrie.</li><li>Sie sind in der Lage, Isotopensysteme zu beschreiben und systematisch zu vergleichen.</li><li>Studierende lernen verschiedene Aufbereitungstechniken im Labor kennen und wenden sie selbst an.</li></ul> |                                        |                                  |                                        |              |
| Module contents                                            |             |              |                                             | <ul style="list-style-type: none"><li>Geochronologische Methoden und Prinzipien der Massenspektrometrie</li><li>Isotopensysteme zur physikalischen Altersbestimmung mit ihren Anwendungsmöglichkeiten</li><li>Laborübung zur Gesteinsaufbereitung und Mineralseparation, Demonstration von Arbeitsschritten im Reinstraumlabor</li></ul>                                                                                                    |                                        |                                  |                                        |              |
| Forms of instruction                                       |             |              |                                             | Lecture (2 SWS)<br>Course<br>Exercises (1 SWS)<br>Course                                                                                                                                                                                                                                                                                                                                                                                    |                                        |                                  |                                        |              |
| Languages of instruction                                   |             |              |                                             | German, English                                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |                                  |                                        |              |
| Duration (semesters)                                       |             |              |                                             | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        |                                  |                                        |              |
| Module frequency                                           |             |              |                                             | jedes Wintersemester                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |
| Module capacity                                            |             |              |                                             | unrestricted                                                                                                                                                                                                                                                                                                                                                                                                                                |                                        |                                  |                                        |              |
| Time of examination                                        |             |              |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |                                  |                                        |              |
| Credit points                                              |             |              |                                             | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |
| Share on module final degree                               |             |              |                                             | Course 1: %; Course 2: %; Course 3: %; Course 4: %.                                                                                                                                                                                                                                                                                                                                                                                         |                                        |                                  |                                        |              |
| Share of module grade on the course of study's final grade |             |              |                                             | 1                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        |                                  |                                        |              |
| Examination                                                |             |              | Exam prerequisites                          |                                                                                                                                                                                                                                                                                                                                                                                                                                             | Type of examination                    |                                  |                                        |              |
| Course 1                                                   |             |              |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |                                  |                                        |              |
| Course 2                                                   |             |              |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |                                  |                                        |              |
| Course 3                                                   |             |              |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |                                  |                                        |              |
| Course 4                                                   |             |              |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |                                  |                                        |              |
| Final exam of module                                       |             |              | Erfolgreiche Bearbeitung von Übungsaufgaben |                                                                                                                                                                                                                                                                                                                                                                                                                                             | Klausur                                |                                  |                                        |              |
| Exam repetition information                                |             |              |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |                                  |                                        |              |
| Module course label                                        | Course type | Course title | SWS                                         | Workload of compulsory attendance                                                                                                                                                                                                                                                                                                                                                                                                           | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| Course 1                                                   | Lecture     | Vorlesung    | 2                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |                                  |                                        | 0            |

| Module course label          | Course type | Course title  | SWS | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
|------------------------------|-------------|---------------|-----|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| <b>Course 2</b>              | Course      | Selbststudium |     |                                   |                                        |                                  |                                        | 0            |
| <b>Course 3</b>              | Exercises   | Übung         |     | 1                                 |                                        |                                  |                                        | 0            |
| <b>Course 4</b>              | Course      | Selbststudium |     |                                   |                                        |                                  |                                        | 0            |
| <b>Workload by module</b>    |             |               |     |                                   |                                        | 150                              |                                        | 150          |
| <b>Total module workload</b> |             |               |     |                                   |                                        |                                  |                                        | 150          |

## GEO.07396.02 - Structural Analysis

|                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                       |
|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| GEO.07396.02                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 5 CP                                                                  |
| Module label                                               | Structural Analysis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                       |
| Module code                                                | GEO.07396.02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                       |
| Semester of first implementation                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                       |
| Module used in courses of study / semesters                | <ul style="list-style-type: none"> <li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Geodynamik</li> </ul>                                                                                                                                                                                                                                                                                                                                        |                                                                       |
| Responsible person for this module                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                       |
| Further responsible persons                                | Prof. Dr. M. Stipp                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                       |
| Prerequisites                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                       |
| Skills to be acquired in this module                       | <ul style="list-style-type: none"> <li>Die Studierenden lernen, Verformung und Kinematik zu identifizieren und zu messen.</li> <li>Sie beherrschen die Techniken der Gefügequantifizierung im Mikro- und Makrobereich (z.B. Fry-, Surfor-, DePaor-Methode) und der Koordinatentransformation.</li> <li>Sie wenden die Berechnungsmethoden zu Spannung und Verformung an und sind in der Lage mit tektonischen Parametern über mehrere Größenordnungen hinweg umzugehen.</li> <li>Sie erkennen aktive Tektonik und können diese in ihrem Gefahrenpotential abschätzen.</li> </ul> |                                                                       |
| Module contents                                            | <ul style="list-style-type: none"> <li>Vertiefte Methoden zur Verformungsanalyse und zur Analyse kinematischer Indikatoren</li> <li>Quantifizierung von Gefügen im Mikro- und Makrobereich sowie Koordinatentransformation</li> <li>Tensorrechnung zu Spannung und Verformung; Skalierung und Modellierung tektonischer Parameter in Raum und Zeit</li> <li>Neotektonische Methoden</li> </ul>                                                                                                                                                                                   |                                                                       |
| Forms of instruction                                       | Lecture (1 SWS)<br>Exercises (1 SWS)<br>Course<br>Exercises (3 SWS)<br>Course                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                       |
| Languages of instruction                                   | German, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                       |
| Duration (semesters)                                       | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                       |
| Module frequency                                           | nicht festlegbar                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                       |
| Module capacity                                            | unrestricted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                       |
| Time of examination                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                       |
| Credit points                                              | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                       |
| Share on module final degree                               | Course 1: %; Course 2: %; Course 3: %; Course 4: %; Course 5: %.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                       |
| Share of module grade on the course of study's final grade | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                       |
| Examination                                                | Exam prerequisites                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Type of examination                                                   |
| Course 1                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                       |
| Course 2                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                       |
| Course 3                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                       |
| Course 4                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                       |
| Course 5                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                       |
| Final exam of module                                       | Erfolgreiche Bearbeitung von Übungsaufgaben                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | mündl. Prüfung oder Klausur oder Hausarbeit, Bericht zur Geländeübung |
| Exam repetition information                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                       |

| Module course label          | Course type | Course title  | SWS | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
|------------------------------|-------------|---------------|-----|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| <b>Course 1</b>              | Lecture     | Vorlesung     |     | 1                                 |                                        |                                  |                                        | 0            |
| <b>Course 2</b>              | Exercises   | Übung         |     | 1                                 |                                        |                                  |                                        | 0            |
| <b>Course 3</b>              | Course      | Selbststudium |     |                                   |                                        |                                  |                                        | 0            |
| <b>Course 4</b>              | Exercises   | Geländeübung  |     | 3                                 |                                        |                                  |                                        | 0            |
| <b>Course 5</b>              | Course      | Selbststudium |     |                                   |                                        |                                  |                                        | 0            |
| <b>Workload by module</b>    |             |               |     |                                   |                                        | 150                              |                                        | 150          |
| <b>Total module workload</b> |             |               |     |                                   |                                        |                                  |                                        | 150          |

## GEO.07394.01 - Deformation and Rheology

|                                                            |             |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                   |                                        |                                  |                                        |              |
|------------------------------------------------------------|-------------|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| GEO.07394.01                                               |             |                                             | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                   |                                        |                                  |                                        |              |
| Module label                                               |             |                                             | Deformation and Rheology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                   |                                        |                                  |                                        |              |
| Module code                                                |             |                                             | GEO.07394.01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                   |                                        |                                  |                                        |              |
| Semester of first implementation                           |             |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                   |                                        |                                  |                                        |              |
| Module used in courses of study / semesters                |             |                                             | <ul style="list-style-type: none"><li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Geodynamik</li></ul>                                                                                                                                                                                                                                                                                                                                        |                                   |                                        |                                  |                                        |              |
| Responsible person for this module                         |             |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                   |                                        |                                  |                                        |              |
| Further responsible persons                                |             |                                             | Prof. Dr. M. Stipp                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                   |                                        |                                  |                                        |              |
| Prerequisites                                              |             |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                   |                                        |                                  |                                        |              |
| Skills to be acquired in this module                       |             |                                             | <ul style="list-style-type: none"><li>Die Studierenden sind in der Lage, Zusammenhänge zwischen Gesteinsverformung, mikrophysikalischen Prozessen und Mikrostrukturen herzustellen und evaluieren.</li><li>Sie können Mikrostrukturen analysieren, Deformationsprozesse quantifizieren und Rheologie von Geomaterialien abschätzen, um tektonische Prozesse besser zu verstehen.</li><li>Sie können gefügeanalytische Methoden anwenden.</li><li>Sie können physikalische Eigenschaften von Gesteinen aus Mikrostruktur und kristallographischer Textur modellieren.</li></ul> |                                   |                                        |                                  |                                        |              |
| Module contents                                            |             |                                             | <ul style="list-style-type: none"><li>Mikrostrukturen bruchhafter und duktiler Deformation, kinematische Indikatoren</li><li>Deformationsmechanismen und deren physikalische Prozesse, Deformation und Metamorphose</li><li>Rheologie und Gefüge, experimentelle Gesteinsverformung</li><li>Entstehung und Analyse kristallographischer Texturen, physikalische Eigenschaften von Gesteinen</li></ul>                                                                                                                                                                          |                                   |                                        |                                  |                                        |              |
| Forms of instruction                                       |             |                                             | Lecture (1 SWS)<br>Exercises (2 SWS)<br>Course                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                   |                                        |                                  |                                        |              |
| Languages of instruction                                   |             |                                             | German, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                   |                                        |                                  |                                        |              |
| Duration (semesters)                                       |             |                                             | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                   |                                        |                                  |                                        |              |
| Module frequency                                           |             |                                             | jedes Wintersemester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                   |                                        |                                  |                                        |              |
| Module capacity                                            |             |                                             | unrestricted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                   |                                        |                                  |                                        |              |
| Time of examination                                        |             |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                   |                                        |                                  |                                        |              |
| Credit points                                              |             |                                             | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                   |                                        |                                  |                                        |              |
| Share on module final degree                               |             |                                             | Course 1: %; Course 2: %; Course 3: %.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   |                                        |                                  |                                        |              |
| Share of module grade on the course of study's final grade |             |                                             | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                   |                                        |                                  |                                        |              |
| Examination                                                |             | Exam prerequisites                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                   | Type of examination                    |                                  |                                        |              |
| Course 1                                                   |             |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                   |                                        |                                  |                                        |              |
| Course 2                                                   |             |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                   |                                        |                                  |                                        |              |
| Course 3                                                   |             |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                   |                                        |                                  |                                        |              |
| Final exam of module                                       |             | Erfolgreiche Bearbeitung von Übungsaufgaben |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                   | mündl. Prüfung oder Klausur            |                                  |                                        |              |
| Exam repetition information                                |             |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                   |                                        |                                  |                                        |              |
| Module course label                                        | Course type | Course title                                | SWS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| Course 1                                                   | Lecture     | Vorlesung                                   | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                   |                                        |                                  |                                        | 0            |
| Course 2                                                   | Exercises   | Übung                                       | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                   |                                        |                                  |                                        |              |

| Module course label          | Course type | Course title  | SWS | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
|------------------------------|-------------|---------------|-----|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| <b>Course 3</b>              | Course      | Selbststudium |     |                                   |                                        |                                  |                                        | 0            |
| <b>Workload by module</b>    |             |               |     |                                   |                                        | 150                              |                                        | 150          |
| <b>Total module workload</b> |             |               |     |                                   |                                        |                                  |                                        | 150          |

## GEO.07393.02 - Tectonics of Mountain Building

|                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
|------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| GEO.07393.02                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 5 CP                |
| Module label                                               | Tectonics of Mountain Building                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |
| Module code                                                | GEO.07393.02                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                     |
| Semester of first implementation                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| Module used in courses of study / semesters                | <ul style="list-style-type: none"> <li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Geodynamik</li> <li>International Area Studies - Global Change Geography (MA120 LP) (Master) &gt; Geographie/Erdkunde IntArStudGlobChaGeoMA120, Version of accreditation (SS 2021 - SoSe 2025) &gt; Ecosystem Analysis and Assessment</li> </ul>                |                     |
| Responsible person for this module                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| Further responsible persons                                | Prof. Dr. Michael Stipp                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     |
| Prerequisites                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| Skills to be acquired in this module                       | <ul style="list-style-type: none"> <li>Die Studierenden entwickeln ein tektonisches Prozessverständnis.</li> <li>Sie sind in der Lage, tektonische Baustile zu unterscheiden und unterschiedlichen lithosphärischen Spannungsregimen zuzuordnen.</li> <li>Sie erkennen und erläutern tektonische Strukturen und ordnen diese in die geodynamischen Konzepte der Gebirgsbildung ein.</li> <li>Sie differenzieren Prozesse der Krustenakkretion über 4,6 Ga Erdgeschichte.</li> </ul> |                     |
| Module contents                                            | <ul style="list-style-type: none"> <li>Baustile und Prozesse in Falten und Überschiebungsgürteln und Kompressionszonen</li> <li>Baustile und Prozesse in Transpressions- und Transtensionszonen</li> <li>Baustile und Prozesse in tektonischen Dehnungszonen</li> <li>Überblick zur regionalen Verbreitung von Gebirgsgürteln der Erde</li> <li>Vertiefende Betrachtung der Alpen, Varisziden oder Kaledoniden</li> <li>Geodynamische Modellvorstellungen</li> </ul>                |                     |
| Forms of instruction                                       | Practical training (2 SWS)<br>Seminar (1 SWS)<br>Course<br>Exercises (4 SWS)<br>Course                                                                                                                                                                                                                                                                                                                                                                                              |                     |
| Languages of instruction                                   | German, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| Duration (semesters)                                       | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |
| Module frequency                                           | nicht festlegbar                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                     |
| Module capacity                                            | unrestricted                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                     |
| Time of examination                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| Credit points                                              | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     |
| Share on module final degree                               | Course 1: %; Course 2: %; Course 2: %; Course 3: %; Course 4: %.                                                                                                                                                                                                                                                                                                                                                                                                                    |                     |
| Share of module grade on the course of study's final grade | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                     |
| Examination                                                | Exam prerequisites                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Type of examination |
| Course 1                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| Course 2                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| Course 2                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| Course 3                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| Course 4                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| Final exam of module                                       | Referat                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Seminarleistung     |
| Exam repetition information                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |

| Module course label          | Course type        | Course title          | SWS | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
|------------------------------|--------------------|-----------------------|-----|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| <b>Course 1</b>              | Practical training | Praktikum und Seminar |     | 2                                 |                                        |                                  |                                        | 0            |
| <b>Course 2</b>              | Seminar            | Seminar               |     | 1                                 |                                        |                                  |                                        | 0            |
| <b>Course 2</b>              | Course             | Selbststudium         |     |                                   |                                        |                                  |                                        | 0            |
| <b>Course 3</b>              | Exercises          | Geländeübung          |     | 4                                 |                                        |                                  |                                        | 0            |
| <b>Course 4</b>              | Course             | Selbststudium         |     |                                   |                                        |                                  |                                        | 0            |
| <b>Workload by module</b>    |                    |                       |     |                                   |                                        | 150                              |                                        | 150          |
| <b>Total module workload</b> |                    |                       |     |                                   |                                        |                                  |                                        | 150          |

## GEO.07395.01 - Mapping and Crustal Balancing

|                                                            |             |                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   |                                        |                                  |                                        |              |
|------------------------------------------------------------|-------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| GEO.07395.01                                               |             |                                                                             | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                   |                                        |                                  |                                        |              |
| Module label                                               |             |                                                                             | Mapping and Crustal Balancing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                   |                                        |                                  |                                        |              |
| Module code                                                |             |                                                                             | GEO.07395.01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                   |                                        |                                  |                                        |              |
| Semester of first implementation                           |             |                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   |                                        |                                  |                                        |              |
| Module used in courses of study / semesters                |             |                                                                             | <ul style="list-style-type: none"><li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Geodynamik</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                 |                                   |                                        |                                  |                                        |              |
| Responsible person for this module                         |             |                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   |                                        |                                  |                                        |              |
| Further responsible persons                                |             |                                                                             | Prof. Dr. M. Stipp                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                   |                                        |                                  |                                        |              |
| Prerequisites                                              |             |                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   |                                        |                                  |                                        |              |
| Skills to be acquired in this module                       |             |                                                                             | <ul style="list-style-type: none"><li>Die Studierenden erlernen, geologisch komplex zusammengesetzte Gebiete, z.B. der Kristallingeologie, im Gelände zu erfassen, im Kartenbild darzustellen, Messwertserien zu akquirieren und die gewonnenen Daten auszuwerten, zu analysieren und in einen raum-zeitlichen Zusammenhang zu setzen.</li><li>Sie wenden strukturanalytische Methoden im Gelände an, um die strukturelle Entwicklung eines Gebietes zu erfassen.</li></ul> <p>Sie rekonstruieren geologische Profile auf Grundlage der gewonnenen Daten und etablieren eine raum-zeitliche Plausibilitätsprüfung und Bilanzierung.</p> |                                   |                                        |                                  |                                        |              |
| Module contents                                            |             |                                                                             | <ul style="list-style-type: none"><li>Geländeaufnahme in strukturell komplexen Gebieten, z.B. Kristallingeologie</li><li>Technik der Profilbilanzierung in Theorie und Praxis</li><li>Erstellen eines anspruchsvollen Berichts</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                |                                   |                                        |                                  |                                        |              |
| Forms of instruction                                       |             |                                                                             | Exercises (5 SWS)<br>Exercises (2 SWS)<br>Course                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                   |                                        |                                  |                                        |              |
| Languages of instruction                                   |             |                                                                             | German, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   |                                        |                                  |                                        |              |
| Duration (semesters)                                       |             |                                                                             | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                   |                                        |                                  |                                        |              |
| Module frequency                                           |             |                                                                             | jedes Sommersemester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                   |                                        |                                  |                                        |              |
| Module capacity                                            |             |                                                                             | unrestricted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                   |                                        |                                  |                                        |              |
| Time of examination                                        |             |                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   |                                        |                                  |                                        |              |
| Credit points                                              |             |                                                                             | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                   |                                        |                                  |                                        |              |
| Share on module final degree                               |             |                                                                             | Course 1: %; Course 2: %; Course 3: %.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                   |                                        |                                  |                                        |              |
| Share of module grade on the course of study's final grade |             |                                                                             | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                   |                                        |                                  |                                        |              |
| Examination                                                |             | Exam prerequisites                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Type of examination               |                                        |                                  |                                        |              |
| Course 1                                                   |             |                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   |                                        |                                  |                                        |              |
| Course 2                                                   |             |                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   |                                        |                                  |                                        |              |
| Course 3                                                   |             |                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   |                                        |                                  |                                        |              |
| Final exam of module                                       |             | Erfolgreiche Bearbeitung von Übungsaufgaben, Referat zu den Geländebefunden |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Bericht zur Geländearbeit         |                                        |                                  |                                        |              |
| Exam repetition information                                |             |                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   |                                        |                                  |                                        |              |
| Module course label                                        | Course type | Course title                                                                | SWS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| Course 1                                                   | Exercises   | Geländeübung                                                                | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                   |                                        |                                  |                                        | 0            |
| Course 2                                                   | Exercises   | Übung                                                                       | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                   |                                        |                                  |                                        | 0            |
| Course 3                                                   | Course      | Selbststudium                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   |                                        |                                  |                                        | 0            |
| Workload by module                                         |             |                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   |                                        | 150                              |                                        | 150          |

| Module course label          | Course type | Course title | SWS | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
|------------------------------|-------------|--------------|-----|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| <b>Total module workload</b> |             |              |     |                                   |                                        |                                  |                                        | <b>150</b>   |

## GEO.07397.01 - Geodynamics Seminar

|                                                            |             |                    |         |                                                                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        |              |
|------------------------------------------------------------|-------------|--------------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| GEO.07397.01                                               |             |                    |         | 5 CP                                                                                                                                                                                                                                                                                                                             |                                        |                                  |                                        |              |
| Module label                                               |             |                    |         | Geodynamics Seminar                                                                                                                                                                                                                                                                                                              |                                        |                                  |                                        |              |
| Module code                                                |             |                    |         | GEO.07397.01                                                                                                                                                                                                                                                                                                                     |                                        |                                  |                                        |              |
| Semester of first implementation                           |             |                    |         |                                                                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        |              |
| Module used in courses of study / semesters                |             |                    |         | <ul style="list-style-type: none"><li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Geodynamik</li></ul>                                                                                          |                                        |                                  |                                        |              |
| Responsible person for this module                         |             |                    |         |                                                                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        |              |
| Further responsible persons                                |             |                    |         | Prof. Dr. M. Stipp                                                                                                                                                                                                                                                                                                               |                                        |                                  |                                        |              |
| Prerequisites                                              |             |                    |         |                                                                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        |              |
| Skills to be acquired in this module                       |             |                    |         | <ul style="list-style-type: none"><li>Die Studierenden sind in der Lage, selbstständig geologisch-geodynamische Fallbeispiele zu analysieren, kritisch zu bewerten und darzustellen.</li><li>Sie besitzen die Fähigkeit zur Anwendung geologischer Techniken in der Rekonstruktion komplexer geodynamischer Szenarien.</li></ul> |                                        |                                  |                                        |              |
| Module contents                                            |             |                    |         | <ul style="list-style-type: none"><li>Aktuelle Forschungsthemen der Geodynamik und Geologie</li></ul>                                                                                                                                                                                                                            |                                        |                                  |                                        |              |
| Forms of instruction                                       |             |                    |         | Seminar (2 SWS)<br>Course                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |
| Languages of instruction                                   |             |                    |         | German, English                                                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        |              |
| Duration (semesters)                                       |             |                    |         | 1 Semester Semester                                                                                                                                                                                                                                                                                                              |                                        |                                  |                                        |              |
| Module frequency                                           |             |                    |         | nicht festlegbar                                                                                                                                                                                                                                                                                                                 |                                        |                                  |                                        |              |
| Module capacity                                            |             |                    |         | unrestricted                                                                                                                                                                                                                                                                                                                     |                                        |                                  |                                        |              |
| Time of examination                                        |             |                    |         |                                                                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        |              |
| Credit points                                              |             |                    |         | 5 CP                                                                                                                                                                                                                                                                                                                             |                                        |                                  |                                        |              |
| Share on module final degree                               |             |                    |         | Course 1: %; Course 2: %.                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |
| Share of module grade on the course of study's final grade |             |                    |         | 1                                                                                                                                                                                                                                                                                                                                |                                        |                                  |                                        |              |
| Examination                                                |             | Exam prerequisites |         |                                                                                                                                                                                                                                                                                                                                  | Type of examination                    |                                  |                                        |              |
| Course 1                                                   |             |                    |         |                                                                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        |              |
| Course 2                                                   |             |                    |         |                                                                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        |              |
| Final exam of module                                       |             |                    | Referat |                                                                                                                                                                                                                                                                                                                                  |                                        | Seminarleistung                  |                                        |              |
| Exam repetition information                                |             |                    |         |                                                                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        |              |
| Module course label                                        | Course type | Course title       | SWS     | Workload of compulsory attendance                                                                                                                                                                                                                                                                                                | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| Course 1                                                   | Seminar     | Seminar            | 2       |                                                                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        | 0            |
| Course 2                                                   | Course      | Selbststudium      |         |                                                                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        | 0            |
| Workload by module                                         |             |                    |         |                                                                                                                                                                                                                                                                                                                                  |                                        |                                  | 150                                    | 150          |
| Total module workload                                      |             |                    |         |                                                                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        | 150          |

## GEO.07723.01 - Advanced mapping course

|                                                            |             |                                                                                                                      |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                                  |                                        |              |
|------------------------------------------------------------|-------------|----------------------------------------------------------------------------------------------------------------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| GEO.07723.01                                               |             |                                                                                                                      |     | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                        |                                  |                                        |              |
| Module label                                               |             |                                                                                                                      |     | Advanced mapping course                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                        |                                  |                                        |              |
| Module code                                                |             |                                                                                                                      |     | GEO.07723.01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        |                                  |                                        |              |
| Semester of first implementation                           |             |                                                                                                                      |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                                  |                                        |              |
| Module used in courses of study / semesters                |             |                                                                                                                      |     | <ul style="list-style-type: none"><li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Geodynamik</li></ul>                                                                                                                                                                                                                                                                                                                                              |                                        |                                  |                                        |              |
| Responsible person for this module                         |             |                                                                                                                      |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                                  |                                        |              |
| Further responsible persons                                |             |                                                                                                                      |     | Prof. Dr. Michael Stipp                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                        |                                  |                                        |              |
| Prerequisites                                              |             |                                                                                                                      |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                                  |                                        |              |
| Skills to be acquired in this module                       |             |                                                                                                                      |     | <ul style="list-style-type: none"><li>Die Studierenden erlernen, geologisch komplex zusammengesetzte Gebiete, z.B. der Kristallingeologie, im Gelände zu erfassen und im Kartenbild darzustellen.</li><li>Sie akquirieren Proben und Messwertserien und werten die gewonnenen Daten aus und interpretieren sie.</li><li>Sie wenden weiterführende analytische Methoden an, um die geologische Entwicklung eines Gebietes zu erfassen.</li><li>Das Modul zielt auf Weisen des Weltzugangs und des geozentrierten Verständnisses in nachhaltiger Perspektive des Erdsystems.</li></ul> |                                        |                                  |                                        |              |
| Module contents                                            |             |                                                                                                                      |     | <ul style="list-style-type: none"><li>Geländeaufnahme in strukturell komplex aufgebauten Gebieten, z.B. Kristallingeologie</li></ul> <p>Auswertung gefügekundlicher Daten</p> <ul style="list-style-type: none"><li>Auswertung gefügekundlicher Daten</li><li>Erstellen eines anspruchsvollen Berichts</li></ul>                                                                                                                                                                                                                                                                     |                                        |                                  |                                        |              |
| Forms of instruction                                       |             |                                                                                                                      |     | Course (6 SWS)<br>Course                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |                                  |                                        |              |
| Languages of instruction                                   |             |                                                                                                                      |     | German, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                                  |                                        |              |
| Duration (semesters)                                       |             |                                                                                                                      |     | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        |              |
| Module frequency                                           |             |                                                                                                                      |     | nicht festlegbar                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                        |                                  |                                        |              |
| Module capacity                                            |             |                                                                                                                      |     | unrestricted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        |                                  |                                        |              |
| Time of examination                                        |             |                                                                                                                      |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                                  |                                        |              |
| Credit points                                              |             |                                                                                                                      |     | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                        |                                  |                                        |              |
| Share on module final degree                               |             |                                                                                                                      |     | Course 1: %; Course 2: %.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |                                  |                                        |              |
| Share of module grade on the course of study's final grade |             |                                                                                                                      |     | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                        |                                  |                                        |              |
| Examination                                                |             | Exam prerequisites                                                                                                   |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Type of examination                    |                                  |                                        |              |
| Course 1                                                   |             |                                                                                                                      |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                                  |                                        |              |
| Course 2                                                   |             |                                                                                                                      |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                                  |                                        |              |
| Final exam of module                                       |             | Referat: Darstellung der Kartielergebnisse anhand der geologischen Karte und Profile zum Abschluss der Geländearbeit |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Hausarbeit zum Geländepraktikum        |                                  |                                        |              |
| Exam repetition information                                |             |                                                                                                                      |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                                  |                                        |              |
| Module course label                                        | Course type | Course title                                                                                                         | SWS | Workload of compulsory attendance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| Course 1                                                   | Course      | Geländepraktikum                                                                                                     | 6   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                                  |                                        | 0            |

| Module course label          | Course type | Course title  | SWS | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
|------------------------------|-------------|---------------|-----|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| <b>Course 2</b>              | Course      | Selbststudium |     |                                   |                                        |                                  |                                        | 0            |
| <b>Workload by module</b>    |             |               |     |                                   |                                        | 150                              |                                        | 150          |
| <b>Total module workload</b> |             |               |     |                                   |                                        |                                  |                                        | 150          |

## GEO.07722.01 - Geodynamic field trip

|                                                            |             |                              |                    |                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |  |      |
|------------------------------------------------------------|-------------|------------------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|--|------|
| GEO.07722.01                                               |             |                              |                    |                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |  | 5 CP |
| Module label                                               |             |                              |                    | Geodynamic field trip                                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        |              |  |      |
| Module code                                                |             |                              |                    | GEO.07722.01                                                                                                                                                                                                                                                                                                           |                                        |                                  |                                        |              |  |      |
| Semester of first implementation                           |             |                              |                    |                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |  |      |
| Module used in courses of study / semesters                |             |                              |                    | <ul style="list-style-type: none"><li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Geodynamik</li></ul>                                                                                |                                        |                                  |                                        |              |  |      |
| Responsible person for this module                         |             |                              |                    |                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |  |      |
| Further responsible persons                                |             |                              |                    | Prof. Dr. Michael Stipp                                                                                                                                                                                                                                                                                                |                                        |                                  |                                        |              |  |      |
| Prerequisites                                              |             |                              |                    |                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |  |      |
| Skills to be acquired in this module                       |             |                              |                    | <ul style="list-style-type: none"><li>Die Studierenden lernen anhand einer Auswahl an Aufschlüssen ein geologisch komplex aufgebautes Zielgebiet kennen.</li><li>Sie verstehen die Entwicklungsprozesse im Rahmen geodynamischer Konzepte der betrachteten Region im Vergleich zu anderen Regionen der Erde.</li></ul> |                                        |                                  |                                        |              |  |      |
| Module contents                                            |             |                              |                    |                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |  |      |
|                                                            |             |                              |                    | <ul style="list-style-type: none"><li>Geologische Aufnahme eines ausgewählten Gebietes zum Geländepraktikum</li></ul>                                                                                                                                                                                                  |                                        |                                  |                                        |              |  |      |
| Forms of instruction                                       |             |                              |                    | Course (8 SWS)<br>Course                                                                                                                                                                                                                                                                                               |                                        |                                  |                                        |              |  |      |
| Languages of instruction                                   |             |                              |                    | German, English                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |  |      |
| Duration (semesters)                                       |             |                              |                    | 2 Semester Semester                                                                                                                                                                                                                                                                                                    |                                        |                                  |                                        |              |  |      |
| Module frequency                                           |             |                              |                    | nicht festlegbar                                                                                                                                                                                                                                                                                                       |                                        |                                  |                                        |              |  |      |
| Module capacity                                            |             |                              |                    | unrestricted                                                                                                                                                                                                                                                                                                           |                                        |                                  |                                        |              |  |      |
| Time of examination                                        |             |                              |                    |                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |  |      |
| Credit points                                              |             |                              |                    | 5 CP                                                                                                                                                                                                                                                                                                                   |                                        |                                  |                                        |              |  |      |
| Share on module final degree                               |             |                              |                    | Course 1: %; Course 2: %.                                                                                                                                                                                                                                                                                              |                                        |                                  |                                        |              |  |      |
| Share of module grade on the course of study's final grade |             |                              |                    | 1                                                                                                                                                                                                                                                                                                                      |                                        |                                  |                                        |              |  |      |
| Examination                                                |             |                              | Exam prerequisites |                                                                                                                                                                                                                                                                                                                        |                                        |                                  | Type of examination                    |              |  |      |
| Course 1                                                   |             |                              |                    |                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |  |      |
| Course 2                                                   |             |                              |                    |                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |  |      |
| Final exam of module                                       |             |                              | Referat            |                                                                                                                                                                                                                                                                                                                        |                                        |                                  | Hausarbeit zum Geländepraktikum        |              |  |      |
| Exam repetition information                                |             |                              |                    |                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |  |      |
| Module course label                                        | Course type | Course title                 | SWS                | Workload of compulsory attendance                                                                                                                                                                                                                                                                                      | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |  |      |
| Course 1                                                   | Course      | Geländepraktikum und Seminar |                    | 8                                                                                                                                                                                                                                                                                                                      |                                        |                                  |                                        | 0            |  |      |
| Course 2                                                   | Course      | Selbststudium                |                    |                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        | 0            |  |      |
| Workload by module                                         |             |                              |                    |                                                                                                                                                                                                                                                                                                                        |                                        |                                  | 150                                    | 150          |  |      |
| Total module workload                                      |             |                              |                    |                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        | 150          |  |      |

## GEO.07721.01 - Crustal Balancing

|                                                            |                    |                    |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |                                                     |                                        |              |
|------------------------------------------------------------|--------------------|--------------------|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-----------------------------------------------------|----------------------------------------|--------------|
| GEO.07721.01                                               |                    |                    |                                             | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |                                                     |                                        |              |
| Module label                                               |                    |                    |                                             | Crustal Balancing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                        |                                                     |                                        |              |
| Module code                                                |                    |                    |                                             | GEO.07721.01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                        |                                                     |                                        |              |
| Semester of first implementation                           |                    |                    |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |                                                     |                                        |              |
| Module used in courses of study / semesters                |                    |                    |                                             | <ul style="list-style-type: none"><li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Geodynamik</li></ul>                                                                                                                                                                                                                                                          |                                        |                                                     |                                        |              |
| Responsible person for this module                         |                    |                    |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |                                                     |                                        |              |
| Further responsible persons                                |                    |                    |                                             | Prof. Dr. Michael Stipp                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                                     |                                        |              |
| Prerequisites                                              |                    |                    |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |                                                     |                                        |              |
| Skills to be acquired in this module                       |                    |                    |                                             | <ul style="list-style-type: none"><li>Studierende erlernen theoretische Konzepte und praktische Methoden um geometrische Rückabwicklungen und krustale Profilbilanzierungen durchzuführen.</li><li>Sie wenden Computer-basierte Techniken zur Rekonstruktion geologischer Profile an.</li></ul>                                                                                                                                                                                                  |                                        |                                                     |                                        |              |
| Module contents                                            |                    |                    |                                             | <ul style="list-style-type: none"><li>Grundlegende Konzepte und Definitionen zur Kinematik und Deformation</li><li>Linien- und Flächenbilanzierung, Geometrie und Kinematik von Störungs-gebundener Faltung</li><li>Interpolation und Extrapolationsmethoden zur Profilkonstruktion</li><li>Unterschiede in der Bilanzierung von thick-skinned und thin-skinned Tektonik</li><li>Computer-basierte vorwärts und rückwärts Modellierung von tektonischen Strukturelementen in 2- und 3D</li></ul> |                                        |                                                     |                                        |              |
| Forms of instruction                                       |                    |                    |                                             | Practical training (2 SWS)<br>Seminar (1 SWS)<br>Course                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                                     |                                        |              |
| Languages of instruction                                   |                    |                    |                                             | German, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |                                                     |                                        |              |
| Duration (semesters)                                       |                    |                    |                                             | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                        |                                                     |                                        |              |
| Module frequency                                           |                    |                    |                                             | nicht festlegbar                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                        |                                                     |                                        |              |
| Module capacity                                            |                    |                    |                                             | unrestricted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                        |                                                     |                                        |              |
| Time of examination                                        |                    |                    |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |                                                     |                                        |              |
| Credit points                                              |                    |                    |                                             | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |                                                     |                                        |              |
| Share on module final degree                               |                    |                    |                                             | Course 1: %; Course 2: %; Course 3: %.                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        |                                                     |                                        |              |
| Share of module grade on the course of study's final grade |                    |                    |                                             | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                        |                                                     |                                        |              |
| Examination                                                |                    | Exam prerequisites |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Type of examination                    |                                                     |                                        |              |
| Course 1                                                   |                    |                    |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |                                                     |                                        |              |
| Course 2                                                   |                    |                    |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |                                                     |                                        |              |
| Course 3                                                   |                    |                    |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |                                                     |                                        |              |
| Final exam of module                                       |                    |                    | Erfolgreiche Bearbeitung von Übungsaufgaben |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        | Hausarbeit oder mündliche oder schriftliche Prüfung |                                        |              |
| Exam repetition information                                |                    |                    |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |                                                     |                                        |              |
| Module course label                                        | Course type        | Course title       | SWS                                         | Workload of compulsory attendance                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Workload of preparation / homework etc | Workload of independent learning                    | Workload (examination and preparation) | Sum workload |
| Course 1                                                   | Practical training | Übung              |                                             | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                        |                                                     |                                        | 0            |
| Course 2                                                   | Seminar            | Seminar            |                                             | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                        |                                                     |                                        | 0            |
| Course 3                                                   | Course             | Selbststudium      |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |                                                     |                                        |              |

| Module course label          | Course type | Course title | SWS | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
|------------------------------|-------------|--------------|-----|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| <b>Workload by module</b>    |             |              |     |                                   |                                        | 150                              |                                        | 150          |
| <b>Total module workload</b> |             |              |     |                                   |                                        |                                  |                                        | 150          |

# Technische Mineralogie

## GEO.07386.01 - Applied and Technical Mineralogy II

|                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                             |
|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| GEO.07386.01                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 5 CP                        |
| Module label                                               | Applied and Technical Mineralogy II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                             |
| Module code                                                | GEO.07386.01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                             |
| Semester of first implementation                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                             |
| Module used in courses of study / semesters                | <ul style="list-style-type: none"> <li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Technische Mineralogie</li> </ul>                                                                                                                                                                                                                                                                                      |                             |
| Responsible person for this module                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                             |
| Further responsible persons                                | Prof. Dr. H. Pöllmann                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                             |
| Prerequisites                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                             |
| Skills to be acquired in this module                       | <ul style="list-style-type: none"> <li>Die Studierenden sind in der Lage, mineralische Zusammensetzungen von Baustoffen, zum Beispiel Kalkprodukte, Gips, Beton sowie anderer bautechnischer Materialien, zu benennen, zu definieren und auf ihre Eignung zu prüfen.</li> <li>Sie können bautechnische Produkte als Rohstoff in der Fertigung, Anwendung und bei der Deponierung bestimmen, charakterisieren und optimieren.</li> <li>Sie sind in Lage Bauschadensanalysen und Schadenskartierungen eigenständig durchzuführen.</li> </ul> |                             |
| Module contents                                            | <ul style="list-style-type: none"> <li>Einführung in die mineralische Zusammensetzung von Baustoffen, zum Beispiel Kalkprodukte, Gips, Beton sowie anderer bautechnischer Materialien</li> <li>Erörterung spezieller Probleme bei der Verwitterung von Gesteinen im Baubereich, von Bauschäden und Möglichkeiten der Bausanierung</li> <li>Aspekte der Bauchemie unter Berücksichtigung von Umwelteinflüssen</li> </ul>                                                                                                                    |                             |
| Forms of instruction                                       | Lecture (2 SWS)<br>Course<br>Exercises (2 SWS)<br>Course                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                             |
| Languages of instruction                                   | German, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                             |
| Duration (semesters)                                       | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                             |
| Module frequency                                           | jedes Sommersemester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                             |
| Module capacity                                            | unrestricted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                             |
| Time of examination                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                             |
| Credit points                                              | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                             |
| Share on module final degree                               | Course 1: %; Course 2: %; Course 3: %; Course 4: %.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                             |
| Share of module grade on the course of study's final grade | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                             |
| Examination                                                | Exam prerequisites                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Type of examination         |
| Course 1                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                             |
| Course 2                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                             |
| Course 3                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                             |
| Course 4                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                             |
| Final exam of module                                       | Erfolgreiche Bearbeitung von Übungsaufgaben                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | mündl. Prüfung oder Klausur |
| Exam repetition information                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                             |

| Module course label          | Course type | Course title                                   | SWS | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
|------------------------------|-------------|------------------------------------------------|-----|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| <b>Course 1</b>              | Lecture     | Vorlesung: Applied and Technical Mineralogy II |     | 2                                 |                                        |                                  |                                        | 0            |
| <b>Course 2</b>              | Course      | Selbststudium                                  |     |                                   |                                        |                                  |                                        | 0            |
| <b>Course 3</b>              | Exercises   | Übung: Applied and Technical Mineralogy II     |     | 2                                 |                                        |                                  |                                        | 0            |
| <b>Course 4</b>              | Course      | Selbststudium                                  |     |                                   |                                        |                                  |                                        | 0            |
| <b>Workload by module</b>    |             |                                                |     |                                   |                                        | 150                              |                                        | 150          |
| <b>Total module workload</b> |             |                                                |     |                                   |                                        |                                  |                                        | 150          |

## GEO.07388.01 - Advanced Exercise in Applied and Environmental Mineralogy

|                                                            |             |                                 |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                                  |                                        |              |
|------------------------------------------------------------|-------------|---------------------------------|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| GEO.07388.01                                               |             |                                 |     | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                  |                                        |              |
| Module label                                               |             |                                 |     | Advanced Exercise in Applied and Environmental Mineralogy                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                        |                                  |                                        |              |
| Module code                                                |             |                                 |     | GEO.07388.01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        |              |
| Semester of first implementation                           |             |                                 |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                                  |                                        |              |
| Module used in courses of study / semesters                |             |                                 |     | <ul style="list-style-type: none"><li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Technische Mineralogie</li></ul>                                                                                                                                                                                                                                                           |                                        |                                  |                                        |              |
| Responsible person for this module                         |             |                                 |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                                  |                                        |              |
| Further responsible persons                                |             |                                 |     | Prof. Dr. H. Pöhlmann                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        |                                  |                                        |              |
| Prerequisites                                              |             |                                 |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                                  |                                        |              |
| Skills to be acquired in this module                       |             |                                 |     | <ul style="list-style-type: none"><li>Die Studierenden analysieren technische Produkte, u.a. Schlacken, Aschen und andere industrielle Reststoffe, können diese klassifizieren und bewerten.</li><li>Sie können Prozesse der Speichermineralbildung und Karbonatisierung beschreiben und interpretieren und erwerben vertiefte Kenntnisse der Umweltmineralogie.</li><li>Sie lernen Produktionsketten im industriellen Umfeld vor Ort kennen und diskutieren Fertigungsprozesse mit den Fachleuten.</li></ul> |                                        |                                  |                                        |              |
| Module contents                                            |             |                                 |     | <ul style="list-style-type: none"><li>Erweiterte Laboruntersuchungen an Produkten aus dem Gebiet der Technischen Mineralogie</li><li>Prozesse der Speichermineralbildung und Karbonatisierung</li><li>Untersuchung von Schlacken, Aschen und anderer industrieller Reststoffe</li><li>Kombination von chemischen und phasenanalytischen Methoden</li><li>Besuch von Industriebetrieben und Diskussion mit Fachleuten vor Ort</li></ul>                                                                        |                                        |                                  |                                        |              |
| Forms of instruction                                       |             |                                 |     | Course (3 SWS)<br>Course<br>Exercises<br>Course                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                                  |                                        |              |
| Languages of instruction                                   |             |                                 |     | German, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                                  |                                        |              |
| Duration (semesters)                                       |             |                                 |     | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        |                                  |                                        |              |
| Module frequency                                           |             |                                 |     | jedes Wintersemester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                  |                                        |              |
| Module capacity                                            |             |                                 |     | unrestricted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        |              |
| Time of examination                                        |             |                                 |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                                  |                                        |              |
| Credit points                                              |             |                                 |     | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                  |                                        |              |
| Share on module final degree                               |             |                                 |     | Course 1: %; Course 2: %; Course 3: %; Course 4: %.                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        |                                  |                                        |              |
| Share of module grade on the course of study's final grade |             |                                 |     | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |                                  |                                        |              |
| Examination                                                |             | Exam prerequisites              |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Type of examination                    |                                  |                                        |              |
| Course 1                                                   |             |                                 |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                                  |                                        |              |
| Course 2                                                   |             |                                 |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                                  |                                        |              |
| Course 3                                                   |             |                                 |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                                  |                                        |              |
| Course 4                                                   |             |                                 |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                                  |                                        |              |
| Final exam of module                                       |             | Protokolle zu den Laaborübungen |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | mündl. Prüfung oder Klausur            |                                  |                                        |              |
| Exam repetition information                                |             |                                 |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                                  |                                        |              |
| Module course label                                        | Course type | Course title                    | SWS | Workload of compulsory attendance                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| Course 1                                                   | Course      | Fortgeschrittene nlaborübung    | 3   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                                  |                                        | 0            |

| Module course label          | Course type | Course title                             | SWS | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
|------------------------------|-------------|------------------------------------------|-----|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
|                              |             | und Vorlesung                            |     |                                   |                                        |                                  |                                        |              |
| <b>Course 2</b>              | Course      | Selbststudium                            |     |                                   |                                        |                                  |                                        | 0            |
| <b>Course 3</b>              | Exercises   | Geländeübung zur Technischen Mineralogie |     |                                   |                                        |                                  |                                        | 0            |
| <b>Course 4</b>              | Course      | Selbststudium                            |     |                                   |                                        |                                  |                                        | 0            |
| <b>Workload by module</b>    |             |                                          |     |                                   |                                        | 150                              |                                        | 150          |
| <b>Total module workload</b> |             |                                          |     |                                   |                                        |                                  |                                        | 150          |

## GEO.07391.01 - Quantitative Mineral Analysis by XRD (Rietveld-Method)

|                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     |
|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| GEO.07391.01                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 5 CP                |
| Module label                                               | Quantitative Mineral Analysis by XRD (Rietveld-Method)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                     |
| Module code                                                | GEO.07391.01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     |
| Semester of first implementation                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     |
| Module used in courses of study / semesters                | <ul style="list-style-type: none"> <li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Technische Mineralogie</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                     |
| Responsible person for this module                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     |
| Further responsible persons                                | Prof. Dr. H. Pöhlmann                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                     |
| Prerequisites                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     |
| Skills to be acquired in this module                       | <ul style="list-style-type: none"> <li>Die Studierenden sind in der Lage, Theorie und Anwendung der Rietveld - Methode zu erläutern und zu verstehen.</li> <li>Sie entwickeln ein Verständnis zur Anwendung spezieller Techniken zur quantitativen Analyse amorpher Phasen und können diese vergleichend bewerten. Sie sind fähig, Proben für qualitative und quantitative Bestimmungen vorzubereiten.</li> <li>Sie können Referenzierungsmethoden zur Kontrolle der ermittelten Phasenanteile anwenden, evaluieren und differenziert interpretieren.</li> </ul>                                                                                                                                                                                                                                                                                                                                                         |                     |
| Module contents                                            | <ul style="list-style-type: none"> <li>Auffrischung der Grundlagen der Röntgenbeugung (Instrument und Beugungstheorie)</li> <li>Fähigkeit der Probenvorbereitung für qualitative und quantitative Bestimmungsmethoden durch Röntgenstrahlen</li> <li>Fertigkeit der Anwendung der Pawley- &amp; LeBail - Methoden, Anwendung zweier Techniken zur Diffraktogrammanalyse (whole-pattern fitting techniques)</li> <li>Kenntnisse hinsichtlich der Anwendung der Rietveld-Methode - Theorie &amp; Grundtechniken</li> <li>Fähigkeit der Anwendung der internen &amp; externen Standardmethoden</li> <li>Fähigkeit der Anwendung der PONKCS-Methode (partial or no known crystal structure)</li> <li>Erlangen von Wissen hinsichtlich weiterer Quantifizierungsmethoden wie PLSR, RIR, PCA, AM &amp; DDM</li> <li>Erlernen von Referenzmethoden zur XRD-Quantifizierung (chemisch, thermisch und spektrometrisch)</li> </ul> |                     |
| Forms of instruction                                       | Lecture (1 SWS)<br>Course<br>Exercises (1 SWS)<br>Course                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |
| Languages of instruction                                   | German, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     |
| Duration (semesters)                                       | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |
| Module frequency                                           | nicht festlegbar                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |
| Module capacity                                            | unrestricted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     |
| Time of examination                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     |
| Credit points                                              | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| Share on module final degree                               | Course 1: %; Course 2: %; Course 3: %; Course 4: %.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |
| Share of module grade on the course of study's final grade | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                     |
| Examination                                                | Exam prerequisites                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Type of examination |
| Course 1                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     |
| Course 2                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     |
| Course 3                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     |
| Course 4                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     |

| Examination                 |             |               | Exam prerequisites                          |                                   |                                        | Type of examination              |                                        |              |
|-----------------------------|-------------|---------------|---------------------------------------------|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| Final exam of module        |             |               | Erfolgreiche Bearbeitung von Übungsaufgaben |                                   |                                        | Projektarbeitsbericht            |                                        |              |
| Exam repetition information |             |               |                                             |                                   |                                        |                                  |                                        |              |
| Module course label         | Course type | Course title  | SWS                                         | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| Course 1                    | Lecture     | Vorlesung     |                                             | 1                                 |                                        |                                  |                                        | 0            |
| Course 2                    | Course      | Selbststudium |                                             |                                   |                                        |                                  |                                        | 0            |
| Course 3                    | Exercises   | Übung         |                                             | 1                                 |                                        |                                  |                                        | 0            |
| Course 4                    | Course      | Selbststudium |                                             |                                   |                                        |                                  |                                        | 0            |
| Workload by module          |             |               |                                             |                                   |                                        | 150                              |                                        | 150          |
| Total module workload       |             |               |                                             |                                   |                                        |                                  |                                        | 150          |

## GEO.07389.01 - Project Management in Applied and Technical Mineralogy

|                                                            |             |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        |                                  |                                        |              |
|------------------------------------------------------------|-------------|---------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| GEO.07389.01                                               |             |               |                    | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                        |                                  |                                        |              |
| Module label                                               |             |               |                    | Project Management in Applied and Technical Mineralogy                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |                                  |                                        |              |
| Module code                                                |             |               |                    | GEO.07389.01                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                                  |                                        |              |
| Semester of first implementation                           |             |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        |                                  |                                        |              |
| Module used in courses of study / semesters                |             |               |                    | <ul style="list-style-type: none"><li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Technische Mineralogie</li></ul>                                                                                                                                                                                                               |                                        |                                  |                                        |              |
| Responsible person for this module                         |             |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        |                                  |                                        |              |
| Further responsible persons                                |             |               |                    | Prof. Dr. H. Pöhlmann                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |                                  |                                        |              |
| Prerequisites                                              |             |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        |                                  |                                        |              |
| Skills to be acquired in this module                       |             |               |                    | <ul style="list-style-type: none"><li>Die Studierenden sind in der Lage, eine mineralogisch-technische Fragestellung zu recherchieren, zu charakterisieren, Kernpunkte zu analysieren und kritisch zu bewerten.</li><li>Sie sind in der Lage, in einer mündlichen Präsentation, die Kernpunkte fachlich differenziert darzustellen.</li><li>Sie sind in der Lage, einen Bericht zu Ihrer Studie zu verfassen und die Ergebnisse korrekt zu diskutieren.</li></ul> |                                        |                                  |                                        |              |
| Module contents                                            |             |               |                    | <ul style="list-style-type: none"><li>Diskussion aktueller mineralogisch-technischer Themen</li></ul>                                                                                                                                                                                                                                                                                                                                                             |                                        |                                  |                                        |              |
| Forms of instruction                                       |             |               |                    | Seminar (2 SWS)<br>Course                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        |                                  |                                        |              |
| Languages of instruction                                   |             |               |                    | German, English                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        |                                  |                                        |              |
| Duration (semesters)                                       |             |               |                    | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                                  |                                        |              |
| Module frequency                                           |             |               |                    | jedes Wintersemester                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                        |                                  |                                        |              |
| Module capacity                                            |             |               |                    | unrestricted                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                                  |                                        |              |
| Time of examination                                        |             |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        |                                  |                                        |              |
| Credit points                                              |             |               |                    | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                        |                                  |                                        |              |
| Share on module final degree                               |             |               |                    | Course 1: %; Course 2: %.                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        |                                  |                                        |              |
| Share of module grade on the course of study's final grade |             |               |                    | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                        |                                  |                                        |              |
| Examination                                                |             |               | Exam prerequisites |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        | Type of examination              |                                        |              |
| Course 1                                                   |             |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        |                                  |                                        |              |
| Course 2                                                   |             |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        |                                  |                                        |              |
| Final exam of module                                       |             |               | Referat            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        | Projektarbeitsbericht            |                                        |              |
| Exam repetition information                                |             |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        |                                  |                                        |              |
| Module course label                                        | Course type | Course title  | SWS                | Workload of compulsory attendance                                                                                                                                                                                                                                                                                                                                                                                                                                 | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| Course 1                                                   | Seminar     | Seminar       | 2                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        |                                  |                                        | 0            |
| Course 2                                                   | Course      | Selbststudium |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        |                                  |                                        | 0            |
| Workload by module                                         |             |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        | 150                              |                                        | 150          |
| Total module workload                                      |             |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        |                                  |                                        | 150          |

## GEO.07385.01 - Applied and Technical Mineralogy I

|                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                             |
|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| GEO.07385.01                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 5 CP                        |
| Module label                                               | Applied and Technical Mineralogy I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                             |
| Module code                                                | GEO.07385.01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |
| Semester of first implementation                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                             |
| Module used in courses of study / semesters                | <ul style="list-style-type: none"> <li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Technische Mineralogie</li> </ul>                                                                                                                                                                                                                                                                                                                                                                  |                             |
| Responsible person for this module                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                             |
| Further responsible persons                                | Prof. Dr. H. Pöhlmann                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                             |
| Prerequisites                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                             |
| Skills to be acquired in this module                       | <ul style="list-style-type: none"> <li>Die Studierenden sind in der Lage, technische Eigenschaften verschiedener Gesteine, Steine und Erden sowie von Rohstoffen und technischen Produkten zu benennen und zu bewerten.</li> <li>Sie können mineralische Produkte als Rohstoffe in der Fertigung, Anwendung und bei der Deponierung bestimmen, charakterisieren und verstehen es, zur Optimierung der Produkte Vorschläge zu erarbeiten und deren Implementierung zu begleiten.</li> <li>Sie können Schäden bei technischen Produkten erkennen und qualitätssichernde Maßnahmen in ihrem Erfolg abschätzen.</li> </ul> |                             |
| Module contents                                            | <ul style="list-style-type: none"> <li>Charakterisierung technischer Eigenschaften verschiedener Materialien, zum Beispiel Keramik</li> </ul> <p>und Gläser, Zeolithe, Feuerfestmaterialien sowie Hartstoffe, Metalle, Pigmente und Kohlenstoffmaterialien</p> <ul style="list-style-type: none"> <li>Einführung in die technische Synthese von oben genannten Materialien</li> <li>Beurteilung von Schäden und Grundlagen der Qualitätssicherung</li> </ul>                                                                                                                                                           |                             |
| Forms of instruction                                       | Lecture (2 SWS)<br>Course<br>Exercises (2 SWS)<br>Course                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                             |
| Languages of instruction                                   | German, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                             |
| Duration (semesters)                                       | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                             |
| Module frequency                                           | jedes Wintersemester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                             |
| Module capacity                                            | unrestricted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |
| Time of examination                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                             |
| Credit points                                              | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                             |
| Share on module final degree                               | Course 1: %; Course 2: %; Course 3: %; Course 4: %.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                             |
| Share of module grade on the course of study's final grade | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                             |
| Examination                                                | Exam prerequisites                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Type of examination         |
| Course 1                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                             |
| Course 2                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                             |
| Course 3                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                             |
| Course 4                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                             |
| Final exam of module                                       | Erfolgreiche Bearbeitung von Übungsaufgaben                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | mündl. Prüfung oder Klausur |
| Exam repetition information                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                             |

| Module course label          | Course type | Course title                                  | SWS | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
|------------------------------|-------------|-----------------------------------------------|-----|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| <b>Course 1</b>              | Lecture     | Vorlesung: Applied and Technical Mineralogy I |     | 2                                 |                                        |                                  |                                        | 0            |
| <b>Course 2</b>              | Course      | Selbststudium                                 |     |                                   |                                        |                                  |                                        | 0            |
| <b>Course 3</b>              | Exercises   | Übung: Applied and Technical Mineralogy I     |     | 2                                 |                                        |                                  |                                        | 0            |
| <b>Course 4</b>              | Course      | Selbststudium                                 |     |                                   |                                        |                                  |                                        | 0            |
| <b>Workload by module</b>    |             |                                               |     |                                   |                                        | 150                              |                                        | 150          |
| <b>Total module workload</b> |             |                                               |     |                                   |                                        |                                  |                                        | 150          |

## GEO.07390.01 - Advanced Methods for the Characterization of Minerals

|                                                            |             |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                  |                                        |              |
|------------------------------------------------------------|-------------|---------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| GEO.07390.01                                               |             |               |                    | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                        |                                  |                                        |              |
| Module label                                               |             |               |                    | Advanced Methods for the Characterization of Minerals                                                                                                                                                                                                                                                                                                                                                                                    |                                        |                                  |                                        |              |
| Module code                                                |             |               |                    | GEO.07390.01                                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |                                  |                                        |              |
| Semester of first implementation                           |             |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                  |                                        |              |
| Module used in courses of study / semesters                |             |               |                    | <ul style="list-style-type: none"><li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Technische Mineralogie</li></ul>                                                                                                                                                                                      |                                        |                                  |                                        |              |
| Responsible person for this module                         |             |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                  |                                        |              |
| Further responsible persons                                |             |               |                    | Prof. Dr. H. Pöhlmann                                                                                                                                                                                                                                                                                                                                                                                                                    |                                        |                                  |                                        |              |
| Prerequisites                                              |             |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                  |                                        |              |
| Skills to be acquired in this module                       |             |               |                    | <ul style="list-style-type: none"><li>Die Studierenden sind in der Lage, besondere Verfahren zur Mineralbestimmung und Mineralcharakterisierung anzuwenden.</li><li>Sie erkennen auf Basis der Untersuchungen die Beziehungen zwischen Mineraleigenschaften und Mineralzusammensetzung.</li><li>Sie sind in der Lage, qualitative und quantitative Bestimmungsverfahren einander gegenüberzustellen, abzuwägen und anzuwenden.</li></ul> |                                        |                                  |                                        |              |
| Module contents                                            |             |               |                    | <ul style="list-style-type: none"><li>Grundlagen spezieller Methoden zur Mineralbestimmung: Gladstone-Dale, Mineralfärbung, selektive Minerallösung, Fluoreszenz, quant. Mineralbestimmung, Clusterbildung, PLSR, Rietveld, Spektroskopie</li></ul>                                                                                                                                                                                      |                                        |                                  |                                        |              |
| Forms of instruction                                       |             |               |                    | Lecture (1 SWS)<br>Course<br>Seminar (1 SWS)<br>Exercises (1 SWS)<br>Course                                                                                                                                                                                                                                                                                                                                                              |                                        |                                  |                                        |              |
| Languages of instruction                                   |             |               |                    | German, English                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                  |                                        |              |
| Duration (semesters)                                       |             |               |                    | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                                  |                                        |              |
| Module frequency                                           |             |               |                    | jedes Wintersemester                                                                                                                                                                                                                                                                                                                                                                                                                     |                                        |                                  |                                        |              |
| Module capacity                                            |             |               |                    | unrestricted                                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |                                  |                                        |              |
| Time of examination                                        |             |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                  |                                        |              |
| Credit points                                              |             |               |                    | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                        |                                  |                                        |              |
| Share on module final degree                               |             |               |                    | Course 1: %; Course 2: %; Course 3: %; Course 4: %; Course 5: %.                                                                                                                                                                                                                                                                                                                                                                         |                                        |                                  |                                        |              |
| Share of module grade on the course of study's final grade |             |               |                    | 1                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |
| Examination                                                |             |               | Exam prerequisites |                                                                                                                                                                                                                                                                                                                                                                                                                                          | Type of examination                    |                                  |                                        |              |
| Course 1                                                   |             |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                  |                                        |              |
| Course 2                                                   |             |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                  |                                        |              |
| Course 3                                                   |             |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                  |                                        |              |
| Course 4                                                   |             |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                  |                                        |              |
| Course 5                                                   |             |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                  |                                        |              |
| Final exam of module                                       |             |               | Referat            |                                                                                                                                                                                                                                                                                                                                                                                                                                          | mündl. Prüfung oder Klausur            |                                  |                                        |              |
| Exam repetition information                                |             |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                  |                                        |              |
| Module course label                                        | Course type | Course title  | SWS                | Workload of compulsory attendance                                                                                                                                                                                                                                                                                                                                                                                                        | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| Course 1                                                   | Lecture     | Vorlesung     | 1                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                  |                                        | 0            |
| Course 2                                                   | Course      | Selbststudium |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                  |                                        | 0            |
| Course 3                                                   | Seminar     | Seminar       | 1                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                  |                                        | 0            |

| Module course label          | Course type | Course title  | SWS | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
|------------------------------|-------------|---------------|-----|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| <b>Course 4</b>              | Exercises   | Übung         |     | 1                                 |                                        |                                  |                                        | 0            |
| <b>Course 5</b>              | Course      | Selbststudium |     |                                   |                                        |                                  |                                        | 0            |
| <b>Workload by module</b>    |             |               |     |                                   |                                        | 150                              |                                        | 150          |
| <b>Total module workload</b> |             |               |     |                                   |                                        |                                  |                                        | 150          |

## GEO.07387.01 - Advanced Laboratory Exercise in Applied and Technical Mineralogy

|                                                            |             |                             |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |
|------------------------------------------------------------|-------------|-----------------------------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| GEO.07387.01                                               |             |                             |                                        | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        |                                  |                                        |              |
| Module label                                               |             |                             |                                        | Advanced Laboratory Exercise in Applied and Technical Mineralogy                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                        |                                  |                                        |              |
| Module code                                                |             |                             |                                        | GEO.07387.01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        |                                  |                                        |              |
| Semester of first implementation                           |             |                             |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |
| Module used in courses of study / semesters                |             |                             |                                        | <ul style="list-style-type: none"><li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Technische Mineralogie</li></ul>                                                                                                                                                                                                                                                    |                                        |                                  |                                        |              |
| Responsible person for this module                         |             |                             |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |
| Further responsible persons                                |             |                             |                                        | Prof. Dr. H. Pöhlmann                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        |                                  |                                        |              |
| Prerequisites                                              |             |                             |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |
| Skills to be acquired in this module                       |             |                             |                                        | <ul style="list-style-type: none"><li>Die Studierenden erwerben Kenntnisse zur Vorgehensweise bei anspruchsvollen Laboruntersuchungen und Tätigkeiten auf dem Gebiet der Technischen Mineralogie.</li><li>Sie wenden verschiedenste Methoden zur Beurteilung von technischen Produkten, zum Beispiel Baustoffe, keramische Produkte oder Gläser, an und bewerten diese auf Zweckmäßigkeit.</li><li>Sie synthetisieren mit Hilfe verschiedenster Methoden Minerale mit und ohne Hydratwasser.</li></ul> |                                        |                                  |                                        |              |
| Module contents                                            |             |                             |                                        | <ul style="list-style-type: none"><li>Laboruntersuchungen an technischen Produkten aus dem Gebiet der Technischen Mineralogie, zum Beispiel Baustoffe, Zemente, keramische Produkten und Gläser</li><li>Synthese von Mineralen mit Hydratwasser</li><li>Hochtemperatursynthese von wasserfreien Mineralen</li></ul>                                                                                                                                                                                    |                                        |                                  |                                        |              |
| Forms of instruction                                       |             |                             |                                        | Exercises (2 SWS)<br>Course<br>Seminar (2 SWS)<br>Course                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                                  |                                        |              |
| Languages of instruction                                   |             |                             |                                        | German, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |
| Duration (semesters)                                       |             |                             |                                        | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                        |                                  |                                        |              |
| Module frequency                                           |             |                             |                                        | jedes Wintersemester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        |                                  |                                        |              |
| Module capacity                                            |             |                             |                                        | unrestricted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        |                                  |                                        |              |
| Time of examination                                        |             |                             |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |
| Credit points                                              |             |                             |                                        | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        |                                  |                                        |              |
| Share on module final degree                               |             |                             |                                        | Course 1: %; Course 2: %; Course 3: %; Course 4: %.                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                        |                                  |                                        |              |
| Share of module grade on the course of study's final grade |             |                             |                                        | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                                  |                                        |              |
| Examination                                                |             |                             | Exam prerequisites                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Type of examination                    |                                  |                                        |              |
| Course 1                                                   |             |                             |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |
| Course 2                                                   |             |                             |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |
| Course 3                                                   |             |                             |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |
| Course 4                                                   |             |                             |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |
| Final exam of module                                       |             |                             | Referat, Protokoll zu den Laborübungen |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        | mündl. Prüfung oder Klausur      |                                        |              |
| Exam repetition information                                |             |                             |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |
| Module course label                                        | Course type | Course title                | SWS                                    | Workload of compulsory attendance                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| Course 1                                                   | Exercises   | Fortgeschrittene Laborübung | 2                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        | 0            |
| Course 2                                                   | Course      | Selbststudium               |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        | 0            |

| Module course label          | Course type | Course title  | SWS | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
|------------------------------|-------------|---------------|-----|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| <b>Course 3</b>              | Seminar     | Seminar       |     | 2                                 |                                        |                                  |                                        | 0            |
| <b>Course 4</b>              | Course      | Selbststudium |     |                                   |                                        |                                  |                                        | 0            |
| <b>Workload by module</b>    |             |               |     |                                   |                                        | 150                              |                                        | 150          |
| <b>Total module workload</b> |             |               |     |                                   |                                        |                                  |                                        | 150          |

# Petrologie und Lagerstättenkunde

## GEO.07400.01 - Magmatic and hydrothermal metallogenetic processes

GEO.07400.01

5 CP

|                     |                                                    |
|---------------------|----------------------------------------------------|
| <b>Module label</b> | Magmatic and hydrothermal metallogenetic processes |
| <b>Module code</b>  | GEO.07400.01                                       |

**Semester of first implementation**

|                                                    |                                                                                                                                                                                                                                                                 |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module used in courses of study / semesters</b> | <ul style="list-style-type: none"> <li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Petrologie und Lagerstättenkunde</li> </ul> |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Responsible person for this module**

**Further responsible persons**

Prof. Dr. G. Borg

**Prerequisites**

**Skills to be acquired in this module**

- Die Studierenden verstehen die Grundlagen der quantitativen Modellierung metallogener Prozesse und können selbst entsprechende Methoden anwenden und regionale Szenarien modellieren.
- Sie erkennen und bewerten lagerstättenkundliche Probleme anhand von Fallbeispielen.

**Module contents**

- Numerische Modellierung hydrothormaler Reaktionen
- Geostatistische Methoden zur Lagerstättenschätzung
- Projektseminar zu aktuellen Themen der Lagerstättenkunde

**Forms of instruction**

Lecture (1 SWS)  
Exercises (1 SWS)  
Seminar (2 SWS)  
Course  
Course

**Languages of instruction**

German, English

**Duration (semesters)**

1 Semester Semester

**Module frequency**

jedes Wintersemester

**Module capacity**

unrestricted

**Time of examination**

**Credit points**

5 CP

**Share on module final degree**

Course 1: %; Course 2: %; Course 3: %; Course 4: %; Course 5: %.

**Share of module grade on the course of study's final grade**

1

Examination

Exam prerequisites

Type of examination

**Course 1**

**Course 2**

**Course 3**

**Course 4**

**Course 5**

**Final exam of module**

Erfolgreiche Bearbeitung von Übungsaufgaben

Seminarleistung

**Exam repetition information**

| Module course label | Course type | Course title             | SWS | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
|---------------------|-------------|--------------------------|-----|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| <b>Course 1</b>     | Lecture     | Vorlesung: Hydrothermale | 1   |                                   |                                        |                                  |                                        | 0            |

| Module course label          | Course type | Course title                                       | SWS | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
|------------------------------|-------------|----------------------------------------------------|-----|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
|                              |             | metallogene Prozesse                               |     |                                   |                                        |                                  |                                        |              |
| <b>Course 2</b>              | Exercises   | Übung: Hydrothermale metallogene Prozesse          |     | 1                                 |                                        |                                  |                                        | 0            |
| <b>Course 3</b>              | Seminar     | Seminar: Modellierung in der Lagerstättenforschung |     | 2                                 |                                        |                                  |                                        | 0            |
| <b>Course 4</b>              | Course      | Ausarbeitung der Übungen                           |     |                                   |                                        |                                  |                                        | 0            |
| <b>Course 5</b>              | Course      | Ausarbeitung des Seminars                          |     |                                   |                                        |                                  |                                        | 0            |
| <b>Workload by module</b>    |             |                                                    |     |                                   |                                        | 150                              |                                        | 150          |
| <b>Total module workload</b> |             |                                                    |     |                                   |                                        |                                  |                                        | 150          |

## GEO.07401.01 - Remote Sensing in mineral exploration

|                                                    |                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GEO.07401.01                                       | 5 CP                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Module label</b>                                | Remote Sensing in mineral exploration                                                                                                                                                                                                                                                                                                                                   |
| <b>Module code</b>                                 | GEO.07401.01                                                                                                                                                                                                                                                                                                                                                            |
| <b>Semester of first implementation</b>            |                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Module used in courses of study / semesters</b> | <ul style="list-style-type: none"> <li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Petrologie und Lagerstättenkunde</li> </ul>                                                                                                         |
| <b>Responsible person for this module</b>          |                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Further responsible persons</b>                 | Prof. Dr. G. Borg                                                                                                                                                                                                                                                                                                                                                       |
| <b>Prerequisites</b>                               |                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Skills to be acquired in this module</b>        | <ul style="list-style-type: none"> <li>Die Studierenden sind in der Lage, eine Potenzialabschätzung in der Exploration mittels Fernerkundung durchzuführen und kritisch zu bewerten.</li> <li>Sie können metallogenetische Konzepte beschreiben, klassifizieren sowie mineralogisches Wissen mit Ergebnisse der Geofernerkundung korrelieren und evaluieren.</li> </ul> |

|                        |                                                                                                                                                                                     |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module contents</b> | <ul style="list-style-type: none"> <li>Methoden der Satellitenfernerkundung</li> <li>Spektrale Explorationsmethoden</li> <li>Fernerkundungsrelevante Lagerstättenaspekte</li> </ul> |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                             |                                                                                                  |
|-----------------------------|--------------------------------------------------------------------------------------------------|
| <b>Forms of instruction</b> | Lecture (1 SWS)<br>Exercises (1 SWS)<br>Course<br>Lecture (1 SWS)<br>Exercises (1 SWS)<br>Course |
|-----------------------------|--------------------------------------------------------------------------------------------------|

|                                                                   |                                                                               |
|-------------------------------------------------------------------|-------------------------------------------------------------------------------|
| <b>Languages of instruction</b>                                   | German, English                                                               |
| <b>Duration (semesters)</b>                                       | 1 Semester Semester                                                           |
| <b>Module frequency</b>                                           | jedes Wintersemester                                                          |
| <b>Module capacity</b>                                            | unrestricted                                                                  |
| <b>Time of examination</b>                                        |                                                                               |
| <b>Credit points</b>                                              | 5 CP                                                                          |
| <b>Share on module final degree</b>                               | Course 1: %; Course 2: %; Course 3: %; Course 4: %; Course 5: %; Course 6: %. |
| <b>Share of module grade on the course of study's final grade</b> | 1                                                                             |

|                 |                    |                     |
|-----------------|--------------------|---------------------|
| Examination     | Exam prerequisites | Type of examination |
| <b>Course 1</b> |                    |                     |
| <b>Course 2</b> |                    |                     |
| <b>Course 3</b> |                    |                     |
| <b>Course 4</b> |                    |                     |
| <b>Course 5</b> |                    |                     |
| <b>Course 6</b> |                    |                     |

|                             |                                             |                       |
|-----------------------------|---------------------------------------------|-----------------------|
| <b>Final exam of module</b> | Erfolgreiche Bearbeitung von Übungsaufgaben | Projektarbeitsbericht |
|-----------------------------|---------------------------------------------|-----------------------|

| Exam repetition information |             |                 |     |                                   |                                        |                                  |                                        |              |
|-----------------------------|-------------|-----------------|-----|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| Module course label         | Course type | Course title    | SWS | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| <b>Course 1</b>             | Lecture     | Vorlesung: Sate | 1   |                                   |                                        |                                  |                                        | 0            |

| Module course label          | Course type | Course title                                                   | SWS | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
|------------------------------|-------------|----------------------------------------------------------------|-----|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
|                              |             | litenfernerkundung zur Lagerstättenexploration                 |     |                                   |                                        |                                  |                                        |              |
| <b>Course 2</b>              | Exercises   | Übung: Satellitenfernerkundung zur Lagerstättenexploration     |     | 1                                 |                                        |                                  |                                        | 0            |
| <b>Course 3</b>              | Course      | Selbststudium                                                  |     |                                   |                                        |                                  |                                        | 0            |
| <b>Course 4</b>              | Lecture     | Vorlesung: Spektrale Explorationsmethoden in Labor und Gelände |     | 1                                 |                                        |                                  |                                        | 0            |
| <b>Course 5</b>              | Exercises   | Übung: Spektrale Explorationsmethoden in Labor und Gelände     |     | 1                                 |                                        |                                  |                                        | 0            |
| <b>Course 6</b>              | Course      | Selbststudium                                                  |     |                                   |                                        |                                  |                                        | 0            |
| <b>Workload by module</b>    |             |                                                                |     |                                   |                                        | 150                              |                                        | 150          |
| <b>Total module workload</b> |             |                                                                |     |                                   |                                        |                                  |                                        | 150          |

## GEO.07403.01 - Mineral characterisation for ore processing techniques

|                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |
|------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| GEO.07403.01                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 5 CP                  |
| Module label                                               | Mineral characterisation for ore processing techniques                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |
| Module code                                                | GEO.07403.01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |
| Semester of first implementation                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |
| Module used in courses of study / semesters                | <ul style="list-style-type: none"> <li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Petrologie und Lagerstättenkunde</li> </ul>                                                                                                                                                                                                                                       |                       |
| Responsible person for this module                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |
| Further responsible persons                                | Prof. Dr. G. Borg                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |
| Prerequisites                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |
| Skills to be acquired in this module                       | <ul style="list-style-type: none"> <li>Die Studierenden besitzen die Fähigkeit zur mineralogischen Charakterisierung von metallführenden Erzen mittels qualitativer und quantitativer Analysemethoden unter Berücksichtigung von Aufbereitungstechniken.</li> <li>Die Studierenden sind in der Lage, Materialcharakteristika von Produkten und Abgängen in den Stoffströmen der Mineralaufbereitung von metallischen Rohstoffen zu bestimmen und zu bewerten.</li> </ul>                              |                       |
| Module contents                                            | <ul style="list-style-type: none"> <li>Techniken der Mineralaufbereitung von Erzen und sekundären mineralischen Rohstoffen von der während aller Verarbeitungsschritte von der Halde bis zum Produkt</li> <li>Granulometrie und Bestimmung von Partikeleigenschaften (Siebanalyse, Lasergranulometrie und Bildverarbeitung)</li> <li>Chemische Charakterisierung (in-situ und Labormethoden)</li> <li>Techniken zur Quantifizierung von Mineralphasen</li> <li>SEM-basierte Mineralanalyse</li> </ul> |                       |
| Forms of instruction                                       | Lecture (2 SWS)<br>Exercises (1 SWS)<br>Course<br>Course<br>Course                                                                                                                                                                                                                                                                                                                                                                                                                                    |                       |
| Languages of instruction                                   | German, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |
| Duration (semesters)                                       | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |
| Module frequency                                           | nicht festlegbar                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |
| Module capacity                                            | unrestricted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |
| Time of examination                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |
| Credit points                                              | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |
| Share on module final degree                               | Course 1: %; Course 2: %; Course 3: %; Course 4: %; Course 5: %.                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |
| Share of module grade on the course of study's final grade | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |
| Examination                                                | Exam prerequisites                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Type of examination   |
| Course 1                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |
| Course 2                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |
| Course 3                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |
| Course 4                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |
| Course 5                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |
| Final exam of module                                       | Erfolgreiche Bearbeitung von Übungsaufgaben                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Projektarbeitsbericht |
| Exam repetition information                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |

| Module course label          | Course type | Course title                                                         | SWS | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
|------------------------------|-------------|----------------------------------------------------------------------|-----|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| <b>Course 1</b>              | Lecture     | Vorlesung                                                            |     | 2                                 |                                        |                                  |                                        | 0            |
| <b>Course 2</b>              | Exercises   | Übung                                                                |     | 1                                 |                                        |                                  |                                        | 0            |
| <b>Course 3</b>              | Course      | Selbststudium:<br>Vor- und Nachbereitung der Vorlesungen und Übungen |     |                                   |                                        |                                  |                                        | 0            |
| <b>Course 4</b>              | Course      | Selbststudium:<br>Literaturrecherche                                 |     |                                   |                                        |                                  |                                        | 0            |
| <b>Course 5</b>              | Course      | Selbststudium:<br>Berichtserstellung                                 |     |                                   |                                        |                                  |                                        | 0            |
| <b>Workload by module</b>    |             |                                                                      |     |                                   |                                        | 150                              |                                        | 150          |
| <b>Total module workload</b> |             |                                                                      |     |                                   |                                        |                                  |                                        | 150          |

## GEO.07399.01 - Conceptual and empirical approaches to metallogeny of ore deposits

|                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| GEO.07399.01                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 5 CP                |
| Module label                                               | Conceptual and empirical approaches to metallogeny of ore deposits                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                     |
| Module code                                                | GEO.07399.01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                     |
| Semester of first implementation                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| Module used in courses of study / semesters                | <ul style="list-style-type: none"> <li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Petrologie und Lagerstättenkunde</li> <li>International Area Studies - Global Change Geography (MA120 LP) (Master) &gt; Geographie/Erdkunde IntArStudGlobChaGeoMA120, Version of accreditation (SS 2021 - SoSe 2025) &gt; Ecosystem Analysis and Assessment</li> <li>Management natürlicher Ressourcen (MA120 LP) (Master) &gt; Landespflege/Landschaftsgestaltung Management nat.RessoMA120, Version of accreditation valid from WS 2021/22 &gt; Wahlpflichtbereich</li> </ul> |                     |
| Responsible person for this module                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| Further responsible persons                                | Prof. Dr. G. Borg                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                     |
| Prerequisites                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| Skills to be acquired in this module                       | <ul style="list-style-type: none"> <li>Die Studierenden erwerben ein vertieftes Verständnis komplexer metallogenetischer Prozesse sowie deren ökonomischer und ökologischer Zusammenhänge.</li> <li>Sie sind in der Lage, Erze und alterierte Nebengesteine zu untersuchen, zu interpretieren und kritisch zu bewerten.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                  |                     |
| Module contents                                            | <ul style="list-style-type: none"> <li>Lagerstättenkunde spezieller und komplexer Rohstoffvorkommen</li> <li>Alternative, ökologisch optimierte Rohstoffvorkommen</li> <li>Pedogene mineralische Rohstoffbildung</li> <li>Erzmikroskopische Methoden (Auflichtmikroskopie)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                               |                     |
| Forms of instruction                                       | Lecture (1 SWS)<br>Exercises (1 SWS)<br>Exercises (2 SWS)<br>Course<br>Course<br>Course                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     |
| Languages of instruction                                   | German, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| Duration (semesters)                                       | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |
| Module frequency                                           | jedes Wintersemester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     |
| Module capacity                                            | unrestricted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                     |
| Time of examination                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| Credit points                                              | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     |
| Share on module final degree                               | Course 1: %; Course 2: %; Course 3: %; Course 4: %; Course 5: %; Course 6: %.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                     |
| Share of module grade on the course of study's final grade | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                     |
| Examination                                                | Exam prerequisites                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Type of examination |
| Course 1                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| Course 2                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| Course 3                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| Course 4                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| Course 5                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| Course 6                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| Final exam of module                                       | Erfolgreiche Bearbeitung von Übungsaufgaben                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Klausur             |

| Examination                 |             |                                        | Exam prerequisites |                                   |                                        | Type of examination              |                                        |              |
|-----------------------------|-------------|----------------------------------------|--------------------|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| Exam repetition information |             |                                        |                    |                                   |                                        |                                  |                                        |              |
| Module course label         | Course type | Course title                           | SWS                | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| Course 1                    | Lecture     | Vorlesung: Spezielle Lagerstättenkunde |                    | 1                                 |                                        |                                  |                                        | 0            |
| Course 2                    | Exercises   | Übung: Spezielle Lagerstättenkunde     |                    | 1                                 |                                        |                                  |                                        | 0            |
| Course 3                    | Exercises   | Übung: Erzmikroskopie                  |                    | 2                                 |                                        |                                  |                                        | 0            |
| Course 4                    | Course      | Selbststudium                          |                    |                                   |                                        |                                  |                                        | 0            |
| Course 5                    | Course      | Mikroskopische Projektarbeit           |                    |                                   |                                        |                                  |                                        | 0            |
| Course 6                    | Course      | Selbststudium                          |                    |                                   |                                        |                                  |                                        | 0            |
| Workload by module          |             |                                        |                    |                                   |                                        |                                  | 150                                    | 150          |
| Total module workload       |             |                                        |                    |                                   |                                        |                                  |                                        | 150          |

## GEO.07402.01 - Advanced analytical methods of mineral deposit research

GEO.07402.01

5 CP

|                                                    |                                                                                                                                                                                                                                                                 |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module label</b>                                | Advanced analytical methods of mineral deposit research                                                                                                                                                                                                         |
| <b>Module code</b>                                 | GEO.07402.01                                                                                                                                                                                                                                                    |
| <b>Semester of first implementation</b>            |                                                                                                                                                                                                                                                                 |
| <b>Module used in courses of study / semesters</b> | <ul style="list-style-type: none"> <li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Petrologie und Lagerstättenkunde</li> </ul> |
| <b>Responsible person for this module</b>          |                                                                                                                                                                                                                                                                 |
| <b>Further responsible persons</b>                 | Prof. Dr. G. Borg                                                                                                                                                                                                                                               |
| <b>Prerequisites</b>                               |                                                                                                                                                                                                                                                                 |
| <b>Skills to be acquired in this module</b>        | <ul style="list-style-type: none"> <li>Die Studierenden erwerben Fähigkeiten zur mineralogischen Charakterisierung von Lagerstätten mittels qualitativer und quantitativer Analysemethoden unter Berücksichtigung von Aufbereitungstechniken.</li> </ul>        |

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module contents</b> | <ul style="list-style-type: none"> <li>Anwendung spezieller analytischer Messmethoden in unterschiedlichen Lagerstättentypen im Labor und Gelände</li> <li>Geeignete Probenahmetechniken im Feld für reproduzierbare und repräsentative Analysen, einschließlich Probenbehandlung und Probenvorbereitung</li> <li>Geologische Feldkenntnissen, insbesondere für Erzlagerstätten (Erze, Nebengesteine, Alterationszonen)</li> </ul> |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                   |                                                     |
|-------------------------------------------------------------------|-----------------------------------------------------|
| <b>Forms of instruction</b>                                       | Lecture (2 SWS)<br>Course<br>Exercises<br>Course    |
| <b>Languages of instruction</b>                                   | German, English                                     |
| <b>Duration (semesters)</b>                                       | 1 Semester Semester                                 |
| <b>Module frequency</b>                                           | nicht festlegbar                                    |
| <b>Module capacity</b>                                            | unrestricted                                        |
| <b>Time of examination</b>                                        |                                                     |
| <b>Credit points</b>                                              | 5 CP                                                |
| <b>Share on module final degree</b>                               | Course 1: %; Course 2: %; Course 3: %; Course 4: %. |
| <b>Share of module grade on the course of study's final grade</b> | 1                                                   |

|                 |                    |                     |
|-----------------|--------------------|---------------------|
| Examination     | Exam prerequisites | Type of examination |
| <b>Course 1</b> |                    |                     |
| <b>Course 2</b> |                    |                     |
| <b>Course 3</b> |                    |                     |
| <b>Course 4</b> |                    |                     |

|                             |                                             |                       |
|-----------------------------|---------------------------------------------|-----------------------|
| <b>Final exam of module</b> | Erfolgreiche Bearbeitung von Übungsaufgaben | Projektarbeitsbericht |
|-----------------------------|---------------------------------------------|-----------------------|

| <b>Exam repetition information</b> |             |                        |     |                                   |                                        |                                  |                                        |              |
|------------------------------------|-------------|------------------------|-----|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| Module course label                | Course type | Course title           | SWS | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| <b>Course 1</b>                    | Lecture     | Vorlesung              | 2   |                                   |                                        |                                  |                                        | 0            |
| <b>Course 2</b>                    | Course      | Selbststudium          |     |                                   |                                        |                                  |                                        | 0            |
| <b>Course 3</b>                    | Exercises   | Übung/Gelände<br>übung |     |                                   |                                        |                                  |                                        | 0            |

| Module course label          | Course type | Course title  | SWS | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
|------------------------------|-------------|---------------|-----|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| <b>Course 4</b>              | Course      | Selbststudium |     |                                   |                                        |                                  |                                        | 0            |
| <b>Workload by module</b>    |             |               |     |                                   |                                        | 150                              |                                        | 150          |
| <b>Total module workload</b> |             |               |     |                                   |                                        |                                  |                                        | 150          |

## Angewandte Geologie

### GEO.07404.01 - Engineering Geology

GEO.07404.01

5 CP

|                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Module label                                | Engineering Geology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Module code                                 | GEO.07404.01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Semester of first implementation            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Module used in courses of study / semesters | <ul style="list-style-type: none"> <li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Angewandte Geologie</li> </ul>                                                                                                                                                                                                                                                                                                                                                                 |
| Responsible person for this module          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Further responsible persons                 | Prof. Dr. P. Bayer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Prerequisites                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Skills to be acquired in this module        | <p>Die Studierenden sind in der Lage,</p> <ul style="list-style-type: none"> <li>die Gesetzmäßigkeiten des Gesteinsverhaltens auf verschiedenen Skalen und unter variierenden Belastungszuständen anzuwenden.</li> <li>Konzepte der Kontinuumsmechanik zur Lösung ingenieurgeologischer Probleme einzusetzen.</li> <li>Felsmechanik mit Geologie, Hydrogeologie und Tektomik in Verbindung zu setzen.</li> <li>Standard-Tests der Felsmechanik im Labor durchzuführen und auszuwerten.</li> <li>Konzepte der Felsmechanik und der Laboruntersuchungen im Rahmen geotechnischer Projekte zu integrieren.</li> </ul> |

#### Module contents

- Spannung und Dehnung
- Elastizitätstheorie und Bruchmechanik
- Spannungsverteilungen
- In-situ Spannungsmessungen
- Klassifikation in Felsklassen
- Felsmechanische Untersuchungen
- Störungen, Brüche und Klüfte
- Gesetze der Poroelastizität

|                                                            |                                                                                         |                     |
|------------------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------|
| Forms of instruction                                       | Lecture (2 SWS)<br>Exercises (1 SWS)<br>Exercises (1 SWS)<br>Course<br>Course<br>Course |                     |
| Languages of instruction                                   | German, English                                                                         |                     |
| Duration (semesters)                                       | 1 Semester Semester                                                                     |                     |
| Module frequency                                           | jedes Sommersemester                                                                    |                     |
| Module capacity                                            | unrestricted                                                                            |                     |
| Time of examination                                        |                                                                                         |                     |
| Credit points                                              | 5 CP                                                                                    |                     |
| Share on module final degree                               | Course 1: %; Course 2: %; Course 3: %; Course 4: %; Course 5: %; Course 6: %.           |                     |
| Share of module grade on the course of study's final grade | 1                                                                                       |                     |
| Examination                                                | Exam prerequisites                                                                      | Type of examination |
| Course 1                                                   |                                                                                         |                     |
| Course 2                                                   |                                                                                         |                     |
| Course 3                                                   |                                                                                         |                     |
| Course 4                                                   |                                                                                         |                     |

| Examination                 |             |                               | Exam prerequisites          |                                   |                                        | Type of examination              |                                        |              |
|-----------------------------|-------------|-------------------------------|-----------------------------|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| Course 5                    |             |                               |                             |                                   |                                        |                                  |                                        |              |
| Course 6                    |             |                               |                             |                                   |                                        |                                  |                                        |              |
| Final exam of module        |             |                               | Protokolle der Laborübungen |                                   |                                        | Klausur                          |                                        |              |
| Exam repetition information |             |                               |                             |                                   |                                        |                                  |                                        |              |
| Module course label         | Course type | Course title                  | SWS                         | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| Course 1                    | Lecture     | Vorlesung Engineering Geology |                             | 2                                 |                                        |                                  |                                        | 0            |
| Course 2                    | Exercises   | Übung                         |                             | 1                                 |                                        |                                  |                                        | 0            |
| Course 3                    | Exercises   | Laborübung                    |                             | 1                                 |                                        |                                  |                                        | 0            |
| Course 4                    | Course      | Protokolle zur Laborübung     |                             |                                   |                                        |                                  |                                        | 0            |
| Course 5                    | Course      | Vor- und Nachbereitung        |                             |                                   |                                        |                                  |                                        | 0            |
| Course 6                    | Course      | Klausurvorbereitung           |                             |                                   |                                        |                                  |                                        | 0            |
| Workload by module          |             |                               |                             |                                   |                                        | 150                              |                                        | 150          |
| Total module workload       |             |                               |                             |                                   |                                        |                                  |                                        | 150          |

## GEO.06496.01 - Project management in applied geology

|                                                            |             |                                      |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |                                  |                                        |              |  |
|------------------------------------------------------------|-------------|--------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|--|
| GEO.06496.01                                               |             |                                      |     | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                        |                                  |                                        |              |  |
| Module label                                               |             |                                      |     | Project management in applied geology                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                                  |                                        |              |  |
| Module code                                                |             |                                      |     | GEO.06496.01                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                                  |                                        |              |  |
| Semester of first implementation                           |             |                                      |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |                                  |                                        |              |  |
| Module used in courses of study / semesters                |             |                                      |     | <ul style="list-style-type: none"><li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Angewandte Geologie</li><li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation (WS 2018/19 - SS 2021) &gt; Angewandte Geologie</li></ul> |                                        |                                  |                                        |              |  |
| Responsible person for this module                         |             |                                      |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |                                  |                                        |              |  |
| Further responsible persons                                |             |                                      |     | NN                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        |                                  |                                        |              |  |
| Prerequisites                                              |             |                                      |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |                                  |                                        |              |  |
| Skills to be acquired in this module                       |             |                                      |     | Umsetzen von wissenschaftlichen Lösungskonzepten in den Themenfeldern der Angewandten Geologie<br>Selbstständige Bearbeitung eines Themas der Angewandten Geologie<br>Integrierte Datenbearbeitung zur räumlichen Analyse und Bewertung                                                                                                                                                                                                                    |                                        |                                  |                                        |              |  |
| Module contents                                            |             |                                      |     | Konzepte zum Projektmanagement<br>Aktuelle Themenschwerpunkte der Angewandten Geologie<br>Methoden der Angewandten Geologie zur Analyse und Bewertung von umweltrelevanten Prozessen in unterschiedlichen räumlichen Skalenbereichen<br>GIS- und Modell-basierte integrierte Analyse- und Prognosetechniken                                                                                                                                                |                                        |                                  |                                        |              |  |
| Forms of instruction                                       |             |                                      |     | Lecture (1 SWS)<br>Seminar (1 SWS)<br>Course<br>Course<br>Course                                                                                                                                                                                                                                                                                                                                                                                           |                                        |                                  |                                        |              |  |
| Languages of instruction                                   |             |                                      |     | German, English                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |                                  |                                        |              |  |
| Duration (semesters)                                       |             |                                      |     | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                                  |                                        |              |  |
| Module frequency                                           |             |                                      |     | jedes Wintersemester                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                        |                                  |                                        |              |  |
| Module capacity                                            |             |                                      |     | unrestricted                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                                  |                                        |              |  |
| Time of examination                                        |             |                                      |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |                                  |                                        |              |  |
| Credit points                                              |             |                                      |     | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                        |                                  |                                        |              |  |
| Share on module final degree                               |             |                                      |     | Course 1: %; Course 2: %; Course 3: %; Course 4: %; Course 5: %.                                                                                                                                                                                                                                                                                                                                                                                           |                                        |                                  |                                        |              |  |
| Share of module grade on the course of study's final grade |             |                                      |     | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                  |                                        |              |  |
| Examination                                                |             | Exam prerequisites                   |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Type of examination                    |                                  |                                        |              |  |
| Course 1                                                   |             |                                      |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |                                  |                                        |              |  |
| Course 2                                                   |             |                                      |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |                                  |                                        |              |  |
| Course 3                                                   |             |                                      |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |                                  |                                        |              |  |
| Course 4                                                   |             |                                      |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |                                  |                                        |              |  |
| Course 5                                                   |             |                                      |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |                                  |                                        |              |  |
| Final exam of module                                       |             |                                      |     | Projektarbeitsbericht oder Seminarleistung                                                                                                                                                                                                                                                                                                                                                                                                                 |                                        |                                  |                                        |              |  |
| Exam repetition information                                |             |                                      |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |                                  |                                        |              |  |
| Module course label                                        | Course type | Course title                         | SWS | Workload of compulsory attendance                                                                                                                                                                                                                                                                                                                                                                                                                          | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |  |
| Course 1                                                   | Lecture     | Project Management                   |     | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                  |                                        | 0            |  |
| Course 2                                                   | Seminar     | Seminar: Projects in applied geology |     | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                  |                                        | 0            |  |
| Course 3                                                   | Course      | Vor- und Nachbereitung               |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |                                  |                                        | 0            |  |
| Course 4                                                   | Course      | Ausarbeitung des Referats            |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |                                  |                                        | 0            |  |

| Module course label          | Course type | Course title                            | SWS | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
|------------------------------|-------------|-----------------------------------------|-----|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| <b>Course 5</b>              | Course      | Ausarbeitung des Projektarbeitsberichts |     |                                   |                                        |                                  |                                        | 0            |
| <b>Workload by module</b>    |             |                                         |     |                                   |                                        | 150                              |                                        | 150          |
| <b>Total module workload</b> |             |                                         |     |                                   |                                        |                                  |                                        | 150          |

## GEO.07351.01 - Hydrogeochemical processes in groundwater and hydrothermal fluids

|                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                            |
|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| GEO.07351.01                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 5 CP                       |
| <b>Module label</b>                                               | Hydrogeochemical processes in groundwater and hydrothermal fluids                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |
| <b>Module code</b>                                                | GEO.07351.01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                            |
| <b>Semester of first implementation</b>                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                            |
| <b>Module used in courses of study / semesters</b>                | <ul style="list-style-type: none"> <li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Angewandte Geologie</li> <li>International Area Studies - Global Change Geography (MA120 LP) (Master) &gt; Geographie/Erdkunde IntArStudGlobChaGeoMA120, Version of accreditation (SS 2021 - SoSe 2025) &gt; Ecosystem Analysis and Assessment</li> <li>Management natürlicher Ressourcen (MA120 LP) (Master) &gt; Landespflege/Landschaftsgestaltung Management nat.RessoMA120, Version of accreditation valid from WS 2021/22 &gt; Wahlpflichtbereich</li> </ul> |                            |
| <b>Responsible person for this module</b>                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                            |
| <b>Further responsible persons</b>                                | apl. Prof. Dr. W. Gossel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                            |
| <b>Prerequisites</b>                                              | keine                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |
| <b>Skills to be acquired in this module</b>                       | <ul style="list-style-type: none"> <li>Die Studierenden erwerben die Kompetenzen:</li> </ul> <p>Stoffverhalten und Stoffausbreitung im Untergrund prozessorientiert zu analysieren,</p> <ul style="list-style-type: none"> <li>hydrochemische Reaktionen im Grundwasser und hydrothermalen Wässern in Gleichgewichten und kinetisch zu modellieren,</li> <li>Modellierungen von Gesteins-Wasser-Wechselwirkungen auf der Basis verfügbarer Eingangsdaten zu bewerten,</li> <li>hydrologische Prozesse mittels stabiler und radioaktiver Isotope zu erfassen.</li> </ul>                                                                                                                |                            |
| <b>Module contents</b>                                            | <ul style="list-style-type: none"> <li>Punktueller, flächenhafter und ubiquitärer Stoffeinträge ins Grundwasser</li> <li>Geostatistische und prozessmodellierende Methoden zur Berechnung von Stoffverteilungen und Stoffverhalten im Grundwasser</li> <li>Hydrogeologische, umweltgeologische und rechtliche Bewertungsverfahren</li> <li>Sanierungsmöglichkeiten von Grundwasserkontaminationen</li> <li>Isotopenhydrologie</li> </ul>                                                                                                                                                                                                                                               |                            |
| <b>Forms of instruction</b>                                       | Lecture (2 SWS)<br>Exercises (1 SWS)<br>Lecture (1 SWS)<br>Course<br>Course<br>Course                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |
| <b>Languages of instruction</b>                                   | German, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                            |
| <b>Duration (semesters)</b>                                       | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            |
| <b>Module frequency</b>                                           | jedes Wintersemester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                            |
| <b>Module capacity</b>                                            | unrestricted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                            |
| <b>Time of examination</b>                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                            |
| <b>Credit points</b>                                              | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                            |
| <b>Share on module final degree</b>                               | Course 1: %; Course 2: %; Course 3: %; Course 4: %; Course 5: %; Course 6: %.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                            |
| <b>Share of module grade on the course of study's final grade</b> | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |
| <b>Examination</b>                                                | <b>Exam prerequisites</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Type of examination</b> |
| <b>Course 1</b>                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                            |

| Examination                 |             |                                                  | Exam prerequisites  |                                   |                                        | Type of examination              |                                        |              |
|-----------------------------|-------------|--------------------------------------------------|---------------------|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| Course 2                    |             |                                                  |                     |                                   |                                        |                                  |                                        |              |
| Course 3                    |             |                                                  |                     |                                   |                                        |                                  |                                        |              |
| Course 4                    |             |                                                  |                     |                                   |                                        |                                  |                                        |              |
| Course 5                    |             |                                                  |                     |                                   |                                        |                                  |                                        |              |
| Course 6                    |             |                                                  |                     |                                   |                                        |                                  |                                        |              |
| Final exam of module        |             |                                                  | Projektpräsentation |                                   |                                        | Klausur                          |                                        |              |
| Exam repetition information |             |                                                  |                     |                                   |                                        |                                  |                                        |              |
| Module course label         | Course type | Course title                                     | SWS                 | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| Course 1                    | Lecture     | Vorlesung Hydrochemical Processes in groundwater |                     | 2                                 |                                        |                                  |                                        | 0            |
| Course 2                    | Exercises   | Übung Hydrochemical Processes in groundwater     |                     | 1                                 |                                        |                                  |                                        | 0            |
| Course 3                    | Lecture     | Vorlesung Isotope hydrology                      |                     | 1                                 |                                        |                                  |                                        | 0            |
| Course 4                    | Course      | Vorbereitung Projektpräsentation                 |                     |                                   |                                        |                                  |                                        | 0            |
| Course 5                    | Course      | Vor und Nachbereitung                            |                     |                                   |                                        |                                  |                                        | 0            |
| Course 6                    | Course      | Klausurvorbereitung                              |                     |                                   |                                        |                                  |                                        | 0            |
| Workload by module          |             |                                                  |                     |                                   |                                        | 150                              |                                        | 150          |
| Total module workload       |             |                                                  |                     |                                   |                                        |                                  |                                        | 150          |

## GEO.05992.02 - Water management

|                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GEO.05992.02                                       | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Module label</b>                                | Water management                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Module code</b>                                 | GEO.05992.02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Semester of first implementation</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Module used in courses of study / semesters</b> | <ul style="list-style-type: none"> <li>• Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Angewandte Geologie</li> <li>• Management natürlicher Ressourcen (MA120 LP) (Master) &gt; Landespflge/Landschaftsgestaltung Management nat.RessoMA120, Version of accreditation valid from WS 2021/22 &gt; Wahlpflichtbereich</li> <li>• Management natürlicher Ressourcen (MA120 LP) (Master) &gt; Landespflge/Landschaftsgestaltung Management nat.RessoMA120, Version of accreditation (WS 2015/16 - SS 2018) &gt; Wahlpflichtmodule</li> <li>• Management natürlicher Ressourcen (MA120 LP) (Master) &gt; Landespflge/Landschaftsgestaltung Management nat.RessoMA120, Version of accreditation (WS 2018/19 - SS 2021) &gt; Wahlpflichtmodule (60 LP - empfohlen werden im 1., 2. und 3. Semester je 20 LP)</li> </ul> |
| <b>Responsible person for this module</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Further responsible persons</b>                 | Prof. Dr. R. Merz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Prerequisites</b>                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Skills to be acquired in this module</b>        | <ul style="list-style-type: none"> <li>• Die Studierenden erlangen</li> </ul> <p>Einblick in prinzipielle Methoden und Ansätze der hydrologischen Modellierung von Oberflächenabfluss.</p> <ul style="list-style-type: none"> <li>• Verständnis für Möglichkeiten und Grenzen hydrologischer Modelle und Bewertung von Modellergebnissen.</li> <li>• Strategien zu einer problemangepassten Wahl hydrologischer Modellkonzepte.</li> <li>• Methoden zum Übergang von der lokalen zur regionalen und globalen Skala.</li> <li>• Verständnis für Prozesse auf der großen Skala.</li> <li>• Konzepte zur Analyse und Modellierung von Wasserflüssen auf der großen Skala.</li> <li>• Fähigkeiten zur Umsetzung und Anwendung hydrologischer Modelle.</li> </ul>                                                                                                                                                                                     |
| <b>Module contents</b>                             | <ul style="list-style-type: none"> <li>• Übersicht über Modellkonzepte in der Modellierung von oberflächlichem Abfluss</li> <li>• Statistische Modelle (Hochwasser- und Niederwasserstatistik)</li> <li>• Niederschlagsabflussmodellierung: Modelltypen, Konzepte</li> <li>• Konzeptmodelle, Aufbau und Modellbausteine, praktische Umsetzung</li> <li>• Prozessorientierte Niederschlag-Abfluss-Modelle</li> <li>• Modellierung des Stofftransportes und Schnittstellen hydrologischer Modelle zu Hydrogeologie, Ökologie, Wasserwirtschaft, etc.</li> <li>• Großräumige Monitoringstrategien</li> </ul>                                                                                                                                                                                                                                                                                                                                        |
| <b>Forms of instruction</b>                        | Lecture (1 SWS)<br>Exercises (1 SWS)<br>Lecture (2 SWS)<br>Course<br>Course<br>Course                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Languages of instruction</b>                    | German, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Duration (semesters)</b>                        | 2 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Module frequency</b>                            | jedes Studienjahr beginnend im Wintersemester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Module capacity</b>                             | unrestricted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Time of examination</b>                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

GEO.05992.02

5 CP

|                                                            |             |                            |                                             |                                                                               |                                        |                                  |                                        |              |
|------------------------------------------------------------|-------------|----------------------------|---------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| Credit points                                              |             |                            |                                             | 5 CP                                                                          |                                        |                                  |                                        |              |
| Share on module final degree                               |             |                            |                                             | Course 1: %; Course 2: %; Course 3: %; Course 4: %; Course 5: %; Course 6: %. |                                        |                                  |                                        |              |
| Share of module grade on the course of study's final grade |             |                            |                                             | 1                                                                             |                                        |                                  |                                        |              |
| Examination                                                |             | Exam prerequisites         |                                             |                                                                               | Type of examination                    |                                  |                                        |              |
| Course 1                                                   |             |                            |                                             |                                                                               |                                        |                                  |                                        |              |
| Course 2                                                   |             |                            |                                             |                                                                               |                                        |                                  |                                        |              |
| Course 3                                                   |             |                            |                                             |                                                                               |                                        |                                  |                                        |              |
| Course 4                                                   |             |                            |                                             |                                                                               |                                        |                                  |                                        |              |
| Course 5                                                   |             |                            |                                             |                                                                               |                                        |                                  |                                        |              |
| Course 6                                                   |             |                            |                                             |                                                                               |                                        |                                  |                                        |              |
| Final exam of module                                       |             |                            | Erfolgreiche Bearbeitung von Übungsaufgaben |                                                                               |                                        | mündl. Prüfung oder Klausur      |                                        |              |
| Exam repetition information                                |             |                            |                                             |                                                                               |                                        |                                  |                                        |              |
| Module course label                                        | Course type | Course title               | SWS                                         | Workload of compulsory attendance                                             | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| Course 1                                                   | Lecture     | Hydrologische Modellierung | 1                                           |                                                                               |                                        |                                  |                                        | 0            |
| Course 2                                                   | Exercises   | Hydrologische Modellierung | 1                                           |                                                                               |                                        |                                  |                                        | 0            |
| Course 3                                                   | Lecture     | Großskalige Hydrologie     | 2                                           |                                                                               |                                        |                                  |                                        | 0            |
| Course 4                                                   | Course      | Nachbereitung/ Aufgaben    |                                             |                                                                               |                                        |                                  |                                        | 0            |
| Course 5                                                   | Course      | Selbststudium              |                                             |                                                                               |                                        |                                  |                                        | 0            |
| Course 6                                                   | Course      | Klausurvorbereitung        |                                             |                                                                               |                                        |                                  |                                        | 0            |
| Workload by module                                         |             |                            |                                             |                                                                               |                                        | 150                              |                                        | 150          |
| Total module workload                                      |             |                            |                                             |                                                                               |                                        |                                  |                                        | 150          |

## GEO.07104.02 - Groundwater Management

|                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GEO.07104.02                                       | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Module label</b>                                | Groundwater Management                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Module code</b>                                 | GEO.07104.02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Semester of first implementation</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Module used in courses of study / semesters</b> | <ul style="list-style-type: none"> <li>• Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Angewandte Geologie</li> <li>• Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation (WS 2018/19 - SS 2021) &gt; Angewandte Geologie</li> <li>• International Area Studies (MA120 LP) (Master) &gt; Geographie/Erdkunde Intern. Area StudiesMA120, Version of accreditation (SS 2019 - SoSe 2024) &gt; Angewandte Geowissenschaften</li> <li>• Management natürlicher Ressourcen (MA120 LP) (Master) &gt; Landespflege/Landschaftsgestaltung Management nat.RessoMA120, Version of accreditation valid from WS 2021/22 &gt; Wahlpflichtbereich</li> <li>• Management natürlicher Ressourcen (MA120 LP) (Master) &gt; Landespflege/Landschaftsgestaltung Management nat.RessoMA120, Version of accreditation (WS 2018/19 - SS 2021) &gt; Wahlpflichtmodule (60 LP - empfohlen werden im 1., 2. und 3. Semester je 20 LP)</li> </ul> |
| <b>Responsible person for this module</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Further responsible persons</b>                 | apl. Prof. Dr. Wolfgang Gossel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Prerequisites</b>                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Skills to be acquired in this module</b>        | <ul style="list-style-type: none"> <li>• Die Studierenden erlangen die Kompetenzen:</li> </ul> <p>Prozesse der qualitativen und quantitativen Bewirtschaftung von Grundwasserressourcen insbesondere in ariden Gebieten zu identifizieren.</p> <ul style="list-style-type: none"> <li>• Schutz und Nutzung der Ressource Grundwasser auf Basis von GIS- und Prozessmodellierungen zu verstehen und zusammenführend weiterzuentwickeln.</li> <li>• Schutzfunktion und Bilanzen von Grundwasser auf verschiedenen Skalen mit Hilfe von GIS-Methoden zu berechnen.</li> <li>• den fachlichen und rechtlichen Rahmens von Grund- und Trinkwasserschutz aktuell zu erlernen und künftig aktualisierend zu recherchieren.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Module contents</b>                             | <ul style="list-style-type: none"> <li>• Ausweisung von vulnerablen Gebieten zum besseren Trink- und Grundwasserschutz sowie Gefährdungen von Grundwasservorkommen</li> <li>• Bilanzierende Untersuchungsmethoden für Grundwasservorkommen in ariden Gebieten</li> <li>• Fachliche Bewertungsverfahren zur Grundwassergefährdung</li> <li>• Nationale und internationale Schutzkonzepte der Grundwasserqualität und -quantität</li> <li>• Wasserkreisläufe in Konzepten zum Grund- und Trinkwasserschutz</li> <li>• Bewirtschaftungskonzepte für Grund-, Trink-, Bewässerungs- und Brauchwasser</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Forms of instruction</b>                        | Lecture (2 SWS)<br>Lecture (2 SWS)<br>Course<br>Course<br>Course                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Languages of instruction</b>                    | German, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Duration (semesters)</b>                        | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Module frequency</b>                            | jedes Wintersemester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Module capacity</b>                             | unrestricted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

GEO.07104.02

5 CP

|                                                            |             |                                        |                     |                                                                  |                                        |                                  |                                        |              |
|------------------------------------------------------------|-------------|----------------------------------------|---------------------|------------------------------------------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| Time of examination                                        |             |                                        |                     |                                                                  |                                        |                                  |                                        |              |
| Credit points                                              |             |                                        |                     | 5 CP                                                             |                                        |                                  |                                        |              |
| Share on module final degree                               |             |                                        |                     | Course 1: %; Course 2: %; Course 3: %; Course 4: %; Course 5: %. |                                        |                                  |                                        |              |
| Share of module grade on the course of study's final grade |             |                                        |                     | 1                                                                |                                        |                                  |                                        |              |
| Examination                                                |             |                                        | Exam prerequisites  |                                                                  |                                        | Type of examination              |                                        |              |
| Course 1                                                   |             |                                        |                     |                                                                  |                                        |                                  |                                        |              |
| Course 2                                                   |             |                                        |                     |                                                                  |                                        |                                  |                                        |              |
| Course 3                                                   |             |                                        |                     |                                                                  |                                        |                                  |                                        |              |
| Course 4                                                   |             |                                        |                     |                                                                  |                                        |                                  |                                        |              |
| Course 5                                                   |             |                                        |                     |                                                                  |                                        |                                  |                                        |              |
| Final exam of module                                       |             |                                        | Projektpräsentation |                                                                  |                                        | Klausur                          |                                        |              |
| Exam repetition information                                |             |                                        |                     |                                                                  |                                        |                                  |                                        |              |
| Module course label                                        | Course type | Course title                           | SWS                 | Workload of compulsory attendance                                | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| Course 1                                                   | Lecture     | Vorlesung/Übung Groundwater management | 2                   |                                                                  |                                        |                                  |                                        | 0            |
| Course 2                                                   | Lecture     | Vorlesung/Übung Groundwater protection | 2                   |                                                                  |                                        |                                  |                                        | 0            |
| Course 3                                                   | Course      | Vor- und Nachbereitung                 |                     |                                                                  |                                        |                                  |                                        | 0            |
| Course 4                                                   | Course      | Projektpräsentation                    |                     |                                                                  |                                        |                                  |                                        | 0            |
| Course 5                                                   | Course      | Vorbereitung Klausur                   |                     |                                                                  |                                        |                                  |                                        | 0            |
| Workload by module                                         |             |                                        |                     |                                                                  |                                        | 150                              |                                        | 150          |
| Total module workload                                      |             |                                        |                     |                                                                  |                                        |                                  |                                        | 150          |

## GEO.07103.02 - Geothermal Energy

GEO.07103.02

5 CP

|                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module label</b>                                | Geothermal Energy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Module code</b>                                 | GEO.07103.02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Semester of first implementation</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Module used in courses of study / semesters</b> | <ul style="list-style-type: none"> <li>• Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Angewandte Geologie</li> <li>• Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation (WS 2018/19 - SS 2021) &gt; Angewandte Geologie</li> <li>• International Area Studies - Global Change Geography (MA120 LP) (Master) &gt; Geographie/Erdkunde IntArStudGlobChaGeoMA120, Version of accreditation (SS 2021 - SoSe 2025) &gt; Ecosystem Analysis and Assessment</li> <li>• International Area Studies (MA120 LP) (Master) &gt; Geographie/Erdkunde Intern. Area StudiesMA120, Version of accreditation (SS 2019 - SoSe 2024) &gt; Angewandte Geowissenschaften</li> <li>• Management natürlicher Ressourcen (MA120 LP) (Master) &gt; Landespflge/Landschaftsgestaltung Management nat.RessoMA120, Version of accreditation valid from WS 2021/22 &gt; Wahlpflichtbereich</li> <li>• Management natürlicher Ressourcen (MA120 LP) (Master) &gt; Landespflge/Landschaftsgestaltung Management nat.RessoMA120, Version of accreditation (WS 2018/19 - SS 2021) &gt; Wahlpflichtmodule (60 LP - empfohlen werden im 1., 2. und 3. Semester je 20 LP)</li> </ul> |
| <b>Responsible person for this module</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Further responsible persons</b>                 | Prof. Dr. Peter Bayer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Prerequisites</b>                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Skills to be acquired in this module</b>        | <ul style="list-style-type: none"> <li>• Die Studierenden sind kompetent in</li> <li>• der Beschreibung von Wärmetransportprozessen in der Erde</li> <li>• der Identifikation von Strömungs- und Transportprozessen, die für die Nutzung geothermischer Energie relevant sind</li> <li>• der Wissensbeschaffung über Funktionsweisen und Leistung geothermischer Technologien</li> <li>• den Leitfäden der Planung und Umsetzung von Systemen zur Nutzung geothermischer Energie</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Module contents</b>                             | <ul style="list-style-type: none"> <li>• Wärmetransport in der Erde und insbesondere in der Erdkruste</li> <li>• Grundlegende Gleichungen und Parameter zur Beschreibung von Wärmetransport</li> <li>• Gelände- und Labormethoden zur Untersuchung geothermischer Bedingungen und Parameter</li> <li>• Tief- und Hoch-Enthalpie-Technologien der Geothermie (Tiefengeothermie)</li> <li>• Flach- und Gering-Enthalpie-Technologien der Geothermie (flache Geothermie)</li> <li>• Nutzung der geothermischen Ressourcen für Heizung, Kühlung und Speicherung</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Forms of instruction</b>                        | Lecture (2 SWS)<br>Study trip (2 SWS)<br>Course<br>Exercises (1 SWS)<br>Course<br>Course<br>Course                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Languages of instruction</b>                    | German, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Duration (semesters)</b>                        | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Module frequency</b>                            | jedes Wintersemester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

GEO.07103.02

5 CP

|                                                            |             |                                                  |     |                                                                                            |                                        |                                  |                                        |              |
|------------------------------------------------------------|-------------|--------------------------------------------------|-----|--------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| Module capacity                                            |             |                                                  |     | unrestricted                                                                               |                                        |                                  |                                        |              |
| Time of examination                                        |             |                                                  |     |                                                                                            |                                        |                                  |                                        |              |
| Credit points                                              |             |                                                  |     | 5 CP                                                                                       |                                        |                                  |                                        |              |
| Share on module final degree                               |             |                                                  |     | Course 1: %; Course 2: %; Course 3: %; Course 3: %; Course 4: %; Course 4: %; Course 5: %. |                                        |                                  |                                        |              |
| Share of module grade on the course of study's final grade |             |                                                  |     | 1                                                                                          |                                        |                                  |                                        |              |
| Examination                                                |             | Exam prerequisites                               |     |                                                                                            | Type of examination                    |                                  |                                        |              |
| Course 1                                                   |             |                                                  |     |                                                                                            |                                        |                                  |                                        |              |
| Course 2                                                   |             |                                                  |     |                                                                                            |                                        |                                  |                                        |              |
| Course 3                                                   |             |                                                  |     |                                                                                            |                                        |                                  |                                        |              |
| Course 3                                                   |             |                                                  |     |                                                                                            |                                        |                                  |                                        |              |
| Course 4                                                   |             |                                                  |     |                                                                                            |                                        |                                  |                                        |              |
| Course 4                                                   |             |                                                  |     |                                                                                            |                                        |                                  |                                        |              |
| Course 5                                                   |             |                                                  |     |                                                                                            |                                        |                                  |                                        |              |
| Final exam of module                                       |             | Protokolle der Geländeübung/Exkursion            |     |                                                                                            | Klausur                                |                                  |                                        |              |
| Exam repetition information                                |             |                                                  |     |                                                                                            |                                        |                                  |                                        |              |
| Module course label                                        | Course type | Course title                                     | SWS | Workload of compulsory attendance                                                          | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| Course 1                                                   | Lecture     | Vorlesung Geothermal Energy                      |     | 2                                                                                          |                                        |                                  |                                        | 0            |
| Course 2                                                   | Study trip  | Übungen, Laborübungen und Geländeübung/Exkursion |     | 2                                                                                          |                                        |                                  |                                        | 0            |
| Course 3                                                   | Course      | Ausarbeitung von Übungen                         |     |                                                                                            |                                        |                                  |                                        | 0            |
| Course 3                                                   | Exercises   | Geothermal Energy                                |     | 1                                                                                          |                                        |                                  |                                        | 0            |
| Course 4                                                   | Course      | Vor und Nachbereitung                            |     |                                                                                            |                                        |                                  |                                        | 0            |
| Course 4                                                   | Course      | Protokolle zur Geländeübung/Exkursion            |     |                                                                                            |                                        |                                  |                                        | 0            |
| Course 5                                                   | Course      | Klausurvorbereitung                              |     |                                                                                            |                                        |                                  |                                        | 0            |
| Workload by module                                         |             |                                                  |     |                                                                                            |                                        | 150                              |                                        | 150          |
| Total module workload                                      |             |                                                  |     |                                                                                            |                                        |                                  |                                        | 150          |

## GEO.07101.02 - Hydrogeology

|                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GEO.07101.02                                       | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Module label</b>                                | Hydrogeology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Module code</b>                                 | GEO.07101.02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Semester of first implementation</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Module used in courses of study / semesters</b> | <ul style="list-style-type: none"> <li>• Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Angewandte Geologie</li> <li>• Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation (WS 2018/19 - SS 2021) &gt; Angewandte Geologie</li> <li>• International Area Studies - Global Change Geography (MA120 LP) (Master) &gt; Geographie/Erdkunde IntArStudGlobChaGeoMA120, Version of accreditation (SS 2021 - SoSe 2025) &gt; Ecosystem Analysis and Assessment</li> <li>• International Area Studies (MA120 LP) (Master) &gt; Geographie/Erdkunde Intern. Area StudiesMA120, Version of accreditation (SS 2019 - SoSe 2024) &gt; Angewandte Geowissenschaften</li> <li>• Management natürlicher Ressourcen (MA120 LP) (Master) &gt; Landespflege/Landschaftsgestaltung Management nat.RessoMA120, Version of accreditation valid from WS 2021/22 &gt; Pflichtmodule</li> <li>• Management natürlicher Ressourcen (MA120 LP) (Master) &gt; Landespflege/Landschaftsgestaltung Management nat.RessoMA120, Version of accreditation (WS 2018/19 - SS 2021) &gt; Wahlpflichtmodule (60 LP - empfohlen werden im 1., 2. und 3. Semester je 20 LP)</li> </ul> |
| <b>Responsible person for this module</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Further responsible persons</b>                 | Prof. Dr. Peter Bayer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Prerequisites</b>                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Skills to be acquired in this module</b>        | <ul style="list-style-type: none"> <li>• Die Studierenden erlangen vertieftes Wissen über die Fließ- und Transportprozesse im Grundwasser in Abhängigkeit von Raum und Zeit.</li> <li>• Die Studierenden beschreiben und identifizieren fortgeschrittene quantitative Konzepte für die Aquiferparameterisierung und die Simulation von Aquiferbedingungen.</li> <li>• Die Studierenden fassen verschiedene hydrogeologische Geländebedingungen und Untersuchungsmethoden zusammen.</li> </ul> <p>Die Studierenden erlangen die Kompetenz, selbstständig hydrogeologische Untersuchungen durchzuführen und die Ergebnisse zu interpretieren.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Module contents</b>                             | <ul style="list-style-type: none"> <li>• Vertiefte hydrogeologische Grundlagen</li> <li>• Strömung in porösen, geklüfteten und verkarsteten Grundwasserleitern</li> <li>• Grundlegende physikalische Gesetze und Parameter für die Beschreibung der Hydraulik und Transportmechanismen im Grundwasser</li> <li>• Formulierung und Lösung von 3D Grundwassertröpfungs- und -transportgleichungen</li> <li>• Bedeutung von Raum und Zeit und Parameter-Skalierung</li> <li>• Brunnenhydraulik und Geländemethoden</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Forms of instruction</b>                        | Lecture (2 SWS)<br>Exercises (2 SWS)<br>Course<br>Course<br>Course                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Languages of instruction</b>                    | German, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Duration (semesters)</b>                        | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Module frequency</b>                            | jedes Wintersemester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Module capacity</b>                             | unrestricted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Time of examination</b>                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

GEO.07101.02

5 CP

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|------------------------------------------------------------|-------------|--------------------------------------|--------------------|------------------------------------------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| Credit points                                              |             |                                      |                    | 5 CP                                                             |                                        |                                  |                                        |              |
| Share on module final degree                               |             |                                      |                    | Course 1: %; Course 2: %; Course 3: %; Course 4: %; Course 5: %. |                                        |                                  |                                        |              |
| Share of module grade on the course of study's final grade |             |                                      |                    | 1                                                                |                                        |                                  |                                        |              |
| Examination                                                |             |                                      | Exam prerequisites |                                                                  | Type of examination                    |                                  |                                        |              |
| Course 1                                                   |             |                                      |                    |                                                                  |                                        |                                  |                                        |              |
| Course 2                                                   |             |                                      |                    |                                                                  |                                        |                                  |                                        |              |
| Course 3                                                   |             |                                      |                    |                                                                  |                                        |                                  |                                        |              |
| Course 4                                                   |             |                                      |                    |                                                                  |                                        |                                  |                                        |              |
| Course 5                                                   |             |                                      |                    |                                                                  |                                        |                                  |                                        |              |
| Final exam of module                                       |             |                                      | Übungsaufgaben     |                                                                  |                                        | Klausur                          |                                        |              |
| Exam repetition information                                |             |                                      |                    |                                                                  |                                        |                                  |                                        |              |
| Module course label                                        | Course type | Course title                         | SWS                | Workload of compulsory attendance                                | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| Course 1                                                   | Lecture     | Hydrogeology                         |                    | 2                                                                |                                        |                                  |                                        | 0            |
| Course 2                                                   | Exercises   | Laborübungen, Übungen und Geländetag |                    | 2                                                                |                                        |                                  |                                        | 0            |
| Course 3                                                   | Course      | Ausarbeitung Übungen                 |                    |                                                                  |                                        |                                  |                                        | 0            |
| Course 4                                                   | Course      | Vor und Nachbereitung                |                    |                                                                  |                                        |                                  |                                        | 0            |
| Course 5                                                   | Course      | Klausurvorbereitung                  |                    |                                                                  |                                        |                                  |                                        | 0            |
| Workload by module                                         |             |                                      |                    |                                                                  |                                        |                                  | 150                                    | 150          |
| Total module workload                                      |             |                                      |                    |                                                                  |                                        |                                  |                                        | 150          |

## GEO.05989.02 - Numerical groundwater modelling

GEO.05989.02

5 CP

**Module label** Numerical groundwater modelling

**Module code** GEO.05989.02

**Semester of first implementation**

**Module used in courses of study / semesters**

- Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) > Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 > Angewandte Geologie
- Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) > Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation (WS 2015/16 - SS 2018) > Hydro- und Umweltgeologie
- Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) > Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation (WS 2018/19 - SS 2021) > Angewandte Geologie
- Informatik (MA120 LP) (Master) > Informatik InformatikMA120, Version of accreditation valid from SoSe 2023 > Angewandte Geowissenschaften
- Informatik (MA120 LP) (Master) > Informatik InformatikMA120, Version of accreditation (WS 2013/14 - SS 2016) > Angewandte Geowissenschaften more...
- Informatik (MA120 LP) (Master) > Informatik InformatikMA120, Version of accreditation (WS 2016/17 - WS 2022/23) > Angewandte Geowissenschaften
- International Area Studies (MA120 LP) (Master) > Geographie/Erdkunde Intern. Area StudiesMA120, Version of accreditation (SS 2019 - SoSe 2024) > Angewandte Geowissenschaften
- International Area Studies (MA120 LP) (Master) > Geographie/Erdkunde Intern. Area StudiesMA120, Version of accreditation (WS 2011/12 - SS 2015) > Angewandte Geowissenschaften
- International Area Studies (MA120 LP) (Master) > Geographie/Erdkunde Intern. Area StudiesMA120, Version of accreditation (WS 2015/16 - WS 2018/19) > Angewandte Geowissenschaften
- Management natürlicher Ressourcen (MA120 LP) (Master) > Landespflege/Landschaftsgestaltung Management nat.RessoMA120, Version of accreditation valid from WS 2021/22 > Wahlpflichtbereich
- Management natürlicher Ressourcen (MA120 LP) (Master) > Landespflege/Landschaftsgestaltung Management nat.RessoMA120, Version of accreditation (WS 2015/16 - SS 2018) > Pflichtmodule
- Management natürlicher Ressourcen (MA120 LP) (Master) > Landespflege/Landschaftsgestaltung Management nat.RessoMA120, Version of accreditation (WS 2018/19 - SS 2021) > Pflichtmodule

**Responsible person for this module**

**Further responsible persons**

apl. Prof. Dr. W. Gossel

**Prerequisites** keine

**Skills to be acquired in this module**

- Die Studierenden sind in der Lage:
- Anwendungsbereiche der Grundwasserströmungs- und Transportmodellierung zu identifizieren,
- Lösungsstrategien zur hydrogeologischen Modellierung zu entwickeln,
- mit verschiedenen numerischen Grundwassermodellierungssystemen und -werkzeugen umzugehen,
- numerische Grundwassermodelle zu bewerten.

**Module contents**

- Numerische Modellierungssysteme für Grundwasserströmung und Transport
- Aufbau von Strukturmodellen und Identifikation von Randbedingungen
- Numerische Lösungsverfahren für Grundwasserströmung und -transport

- Quantifizierung und Aufbereitung hydrogeologischer Parameter für Strömung und Transport
- Modellierungssysteme und -werkzeuge
- Kalibrierung numerischer Grundwasserströmungs- und -transportmodelle

|                                                            |             |                                                            |                                             |                                                                                                  |                                        |                                  |                                        |              |
|------------------------------------------------------------|-------------|------------------------------------------------------------|---------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| Forms of instruction                                       |             |                                                            |                                             | Lecture (2 SWS)<br>Lecture (2 SWS)<br>Exercises (1 SWS)<br>Course<br>Exercises (1 SWS)<br>Course |                                        |                                  |                                        |              |
| Languages of instruction                                   |             |                                                            |                                             | German, English                                                                                  |                                        |                                  |                                        |              |
| Duration (semesters)                                       |             |                                                            |                                             | 1 Semester Semester                                                                              |                                        |                                  |                                        |              |
| Module frequency                                           |             |                                                            |                                             | jedes Sommersemester                                                                             |                                        |                                  |                                        |              |
| Module capacity                                            |             |                                                            |                                             | unrestricted                                                                                     |                                        |                                  |                                        |              |
| Time of examination                                        |             |                                                            |                                             |                                                                                                  |                                        |                                  |                                        |              |
| Credit points                                              |             |                                                            |                                             | 5 CP                                                                                             |                                        |                                  |                                        |              |
| Share on module final degree                               |             |                                                            |                                             | Course 1: %; Course 2: %; Course 2: %; Course 3: %; Course 4: %; Course 4: %.                    |                                        |                                  |                                        |              |
| Share of module grade on the course of study's final grade |             |                                                            |                                             | 1                                                                                                |                                        |                                  |                                        |              |
| Examination                                                |             |                                                            | Exam prerequisites                          |                                                                                                  | Type of examination                    |                                  |                                        |              |
| Course 1                                                   |             |                                                            |                                             |                                                                                                  |                                        |                                  |                                        |              |
| Course 2                                                   |             |                                                            |                                             |                                                                                                  |                                        |                                  |                                        |              |
| Course 2                                                   |             |                                                            |                                             |                                                                                                  |                                        |                                  |                                        |              |
| Course 3                                                   |             |                                                            |                                             |                                                                                                  |                                        |                                  |                                        |              |
| Course 4                                                   |             |                                                            |                                             |                                                                                                  |                                        |                                  |                                        |              |
| Course 4                                                   |             |                                                            |                                             |                                                                                                  |                                        |                                  |                                        |              |
| Final exam of module                                       |             |                                                            | Erfolgreiche Bearbeitung von Übungsaufgaben |                                                                                                  |                                        | Klausur oder Seminarleistung     |                                        |              |
| Exam repetition information                                |             |                                                            |                                             |                                                                                                  |                                        |                                  |                                        |              |
| Module course label                                        | Course type | Course title                                               | SWS                                         | Workload of compulsory attendance                                                                | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| Course 1                                                   | Lecture     | Vorlesung/Übung: Numerical groundwater flow modelling      | 2                                           |                                                                                                  |                                        |                                  |                                        | 0            |
| Course 2                                                   | Lecture     | Vorlesung/Übung: Numerical groundwater transport modelling | 2                                           |                                                                                                  |                                        |                                  |                                        | 0            |
| Course 2                                                   | Exercises   | Übung Strömungsmodellierung                                | 1                                           |                                                                                                  |                                        |                                  |                                        | 0            |
| Course 3                                                   | Course      | Nachbereitung/ Aufgaben                                    |                                             |                                                                                                  |                                        |                                  |                                        | 0            |
| Course 4                                                   | Exercises   | Übung Transportmodellierung                                | 1                                           |                                                                                                  |                                        |                                  |                                        | 0            |
| Course 4                                                   | Course      | Klausurvorbereitung oder Projektarbeit                     |                                             |                                                                                                  |                                        |                                  |                                        | 0            |
| Workload by module                                         |             |                                                            |                                             |                                                                                                  |                                        | 150                              |                                        | 150          |
| Total module workload                                      |             |                                                            |                                             |                                                                                                  |                                        |                                  |                                        | 150          |

## GEO.05990.02 - Special mathematics for geoscientists

GEO.05990.02

5 CP

|                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module label</b>                                | Special mathematics for geoscientists                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Module code</b>                                 | GEO.05990.02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Semester of first implementation</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Module used in courses of study / semesters</b> | <ul style="list-style-type: none"> <li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Angewandte Geologie</li> <li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation (WS 2015/16 - SS 2018) &gt; Hydro- und Umweltgeologie</li> <li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation (WS 2018/19 - SS 2021) &gt; Angewandte Geologie</li> <li>International Area Studies (MA120 LP) (Master) &gt; Geographie/Erdkunde Intern. Area StudiesMA120, Version of accreditation (SS 2019 - SoSe 2024) &gt; Angewandte Geowissenschaften</li> <li>International Area Studies (MA120 LP) (Master) &gt; Geographie/Erdkunde Intern. Area StudiesMA120, Version of accreditation (WS 2011/12 - SS 2015) &gt; Angewandte Geowissenschaften</li> <li>International Area Studies (MA120 LP) (Master) &gt; Geographie/Erdkunde Intern. Area StudiesMA120, Version of accreditation (WS 2015/16 - WS 2018/19) &gt; Angewandte Geowissenschaften</li> <li>Management natürlicher Ressourcen (MA120 LP) (Master) &gt; Landespflege/Landschaftsgestaltung Management nat.RessoMA120, Version of accreditation valid from WS 2021/22 &gt; Pflichtmodule</li> <li>Management natürlicher Ressourcen (MA120 LP) (Master) &gt; Landespflege/Landschaftsgestaltung Management nat.RessoMA120, Version of accreditation (WS 2015/16 - SS 2018) &gt; Pflichtmodule</li> <li>Management natürlicher Ressourcen (MA120 LP) (Master) &gt; Landespflege/Landschaftsgestaltung Management nat.RessoMA120, Version of accreditation (WS 2018/19 - SS 2021) &gt; Pflichtmodule</li> </ul> |
| <b>Responsible person for this module</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Further responsible persons</b>                 | apl. Prof. Dr. W. Gossel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Prerequisites</b>                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Skills to be acquired in this module</b>        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

- Die Studierenden erwerben Kompetenzen darin:

Einsatzbereiche für statistische, geostatistische und numerische Methoden in den Geowissenschaften zu identifizieren,

- (geo)statistische und numerische Methoden an anwendungsorientierten geowissenschaftlichen und nachhaltigen und ökologischen Beispielfragen zu erproben und
- die Ergebnisse dieser mathematischen Lösungen zu visualisieren und zu bewerten.

### Module contents

- Multivariate Statistik,
- Geostatistik,
- numerische Lösungen einfacher und partieller und gekoppelter partieller Differentialgleichungen in den Geowissenschaften und in der Ökologie
- Big Data Analyse für ökologische Fragen

### Forms of instruction

Lecture (2 SWS)  
Lecture (2 SWS)  
Exercises  
Course  
Course

GEO.05990.02

5 CP

|                                                            |             |                                                                                               |                                             |                                                                  |                                        |                                  |                                        |              |
|------------------------------------------------------------|-------------|-----------------------------------------------------------------------------------------------|---------------------------------------------|------------------------------------------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| Languages of instruction                                   |             |                                                                                               |                                             | German, English                                                  |                                        |                                  |                                        |              |
| Duration (semesters)                                       |             |                                                                                               |                                             | 1 Semester Semester                                              |                                        |                                  |                                        |              |
| Module frequency                                           |             |                                                                                               |                                             | jedes Wintersemester                                             |                                        |                                  |                                        |              |
| Module capacity                                            |             |                                                                                               |                                             | unrestricted                                                     |                                        |                                  |                                        |              |
| Time of examination                                        |             |                                                                                               |                                             |                                                                  |                                        |                                  |                                        |              |
| Credit points                                              |             |                                                                                               |                                             | 5 CP                                                             |                                        |                                  |                                        |              |
| Share on module final degree                               |             |                                                                                               |                                             | Course 1: %; Course 2: %; Course 3: %; Course 4: %; Course 5: %. |                                        |                                  |                                        |              |
| Share of module grade on the course of study's final grade |             |                                                                                               |                                             | 1                                                                |                                        |                                  |                                        |              |
| Examination                                                |             |                                                                                               | Exam prerequisites                          |                                                                  | Type of examination                    |                                  |                                        |              |
| Course 1                                                   |             |                                                                                               |                                             |                                                                  |                                        |                                  |                                        |              |
| Course 2                                                   |             |                                                                                               |                                             |                                                                  |                                        |                                  |                                        |              |
| Course 3                                                   |             |                                                                                               |                                             |                                                                  |                                        |                                  |                                        |              |
| Course 4                                                   |             |                                                                                               |                                             |                                                                  |                                        |                                  |                                        |              |
| Course 5                                                   |             |                                                                                               |                                             |                                                                  |                                        |                                  |                                        |              |
| Final exam of module                                       |             |                                                                                               | Erfolgreiche Bearbeitung von Übungsaufgaben |                                                                  |                                        | Klausur                          |                                        |              |
| Exam repetition information                                |             |                                                                                               |                                             |                                                                  |                                        |                                  |                                        |              |
| Module course label                                        | Course type | Course title                                                                                  | SWS                                         | Workload of compulsory attendance                                | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| Course 1                                                   | Lecture     | Vorlesung/Übung Special mathematics for geoscientists: Numerical methods                      |                                             | 2                                                                |                                        |                                  |                                        | 0            |
| Course 2                                                   | Lecture     | Vorlesung/Übung Special mathematics for geoscientists: Statistical and geostatistical methods |                                             | 2                                                                |                                        |                                  |                                        | 0            |
| Course 3                                                   | Exercises   | Übungsaufgaben                                                                                |                                             |                                                                  |                                        |                                  |                                        | 0            |
| Course 4                                                   | Course      | Selbststudium Nachbereitung Übung                                                             |                                             |                                                                  |                                        |                                  |                                        | 0            |
| Course 5                                                   | Course      | Selbststudium Klausurvorbereitung                                                             |                                             |                                                                  |                                        |                                  |                                        | 0            |
| Workload by module                                         |             |                                                                                               |                                             |                                                                  |                                        |                                  | 150                                    | 150          |
| Total module workload                                      |             |                                                                                               |                                             |                                                                  |                                        |                                  |                                        | 150          |

## Wahlpflichtmodule Nebenfächer

### GEO.07212.02 - Land System Science 1: Global Environmental Change

|                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GEO.07212.02                                       | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Module label</b>                                | Land System Science 1: Global Environmental Change                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Module code</b>                                 | GEO.07212.02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Semester of first implementation</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Module used in courses of study / semesters</b> | <ul style="list-style-type: none"> <li>• Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Wahlpflichtmodule Nebenfächer</li> <li>• Biodiversity Sciences (MA120 LP) (Master) &gt; Biologie BiodiversityMA120, Version of accreditation valid from SS 2021 &gt; Project modules offered by the Institute of Geosciences and Geography (Nat Sci III)</li> <li>• International Area Studies - Global Change Geography (MA120 LP) (Master) &gt; Geographie/Erdkunde IntArStudGlobChaGeoMA120, Version of accreditation (SS 2021 - SoSe 2025) &gt; Schwerpunkt- oder Ergänzungsbereich: Land Systems Science (LSS)</li> <li>• Management natürlicher Ressourcen (MA120 LP) (Master) &gt; Landespflege/Landschaftsgestaltung Management nat.RessoMA120, Version of accreditation valid from WS 2021/22 &gt; Wahlpflichtbereich</li> </ul> |
| <b>Responsible person for this module</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Further responsible persons</b>                 | Prof. Dr. Christopher Conrad                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Prerequisites</b>                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Skills to be acquired in this module</b>        | <ul style="list-style-type: none"> <li>• Theoretische Konzepte zur Erfassung, Analyse und Bewertung des Globalen Wandels und der Nachhaltigkeit benennen, abrufen, beschreiben, unterscheiden, interpretieren und erklären</li> <li>• Landsysteme als Ergebnis globalen Wandels erkennen, interpretieren und differenzieren</li> <li>• Lösungsansätze, sowie die Möglichkeiten und Herausforderungen bei der Erarbeitung selbiger kennenlernen, gegenüberstellen und vor dem Hintergrund ihrer Nachhaltigkeit kritisch bewerten</li> <li>• Wissen über den Zustand und Entwicklungen (Trends) von Landsystemen anhand von Fallstudien sammeln, anwenden, bewerten und damit argumentieren</li> <li>• Digitale Daten und Werkzeuge, Landsysteme zu erfassen, eigenständig nutzen, und damit Treiber und Auswirkungen von Veränderung der Landsysteme erkennen und bewerten</li> </ul>                                                                            |
| <b>Module contents</b>                             | <ul style="list-style-type: none"> <li>• Theoretische Konzepte: Globaler Wandel, Umweltsyndrome, Landsysteme, Landnutzung und Ökosystemleistungen, Nexus-Forschung, Nachhaltigkeit</li> <li>• Methodische Ansätze, die globalen Wandel erfassen, analysieren und bewerten lassen und zu Handlungsempfehlungen führen: Ökologische Footprintanalysen, Statistische Analysen von raumzeitlichen Zusammenhängen, Mixed Methods Ansätze</li> <li>• Datenkonzepte und existierende Daten auf unterschiedlichen Maßstabsebenen, die den Zustand und die Veränderungen von Landsystemen beschreiben lassen</li> <li>• Erfassung des Status, von Veränderungen und Trends von Landsystemen mit Methoden der Fernerkundung</li> </ul>                                                                                                                                                                                                                                    |
| <b>Forms of instruction</b>                        | Lecture (2 SWS)<br>Exercises (2 SWS)<br>Course<br>Course<br>Course                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Languages of instruction</b>                    | German, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Duration (semesters)</b>                        | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

GEO.07212.02

5 CP

|                                                            |             |                                  |                  |                                                                  |                                        |                                                |                                        |              |
|------------------------------------------------------------|-------------|----------------------------------|------------------|------------------------------------------------------------------|----------------------------------------|------------------------------------------------|----------------------------------------|--------------|
| Module frequency                                           |             |                                  |                  | jedes Wintersemester                                             |                                        |                                                |                                        |              |
| Module capacity                                            |             |                                  |                  | unrestricted                                                     |                                        |                                                |                                        |              |
| Time of examination                                        |             |                                  |                  |                                                                  |                                        |                                                |                                        |              |
| Credit points                                              |             |                                  |                  | 5 CP                                                             |                                        |                                                |                                        |              |
| Share on module final degree                               |             |                                  |                  | Course 1: %; Course 2: %; Course 3: %; Course 4: %; Course 5: %. |                                        |                                                |                                        |              |
| Share of module grade on the course of study's final grade |             |                                  |                  | 1                                                                |                                        |                                                |                                        |              |
| Examination                                                |             | Exam prerequisites               |                  |                                                                  | Type of examination                    |                                                |                                        |              |
| Course 1                                                   |             |                                  |                  |                                                                  |                                        |                                                |                                        |              |
| Course 2                                                   |             |                                  |                  |                                                                  |                                        |                                                |                                        |              |
| Course 3                                                   |             |                                  |                  |                                                                  |                                        |                                                |                                        |              |
| Course 4                                                   |             |                                  |                  |                                                                  |                                        |                                                |                                        |              |
| Course 5                                                   |             |                                  |                  |                                                                  |                                        |                                                |                                        |              |
| Final exam of module                                       |             |                                  | Übungsaufgabe(n) |                                                                  |                                        | Klausur oder Hausarbeit oder mündliche Prüfung |                                        |              |
| Exam repetition information                                |             |                                  |                  |                                                                  |                                        |                                                |                                        |              |
| Module course label                                        | Course type | Course title                     | SWS              | Workload of compulsory attendance                                | Workload of preparation / homework etc | Workload of independent learning               | Workload (examination and preparation) | Sum workload |
| Course 1                                                   | Lecture     | Vorlesung                        |                  | 2                                                                |                                        |                                                |                                        | 0            |
| Course 2                                                   | Exercises   | Übung                            |                  | 2                                                                |                                        |                                                |                                        | 0            |
| Course 3                                                   | Course      | Vor- und Nachbereitung Vorlesung |                  |                                                                  |                                        |                                                |                                        | 0            |
| Course 4                                                   | Course      | Vor- und Nachbereitung Übung     |                  |                                                                  |                                        |                                                |                                        | 0            |
| Course 5                                                   | Course      | Vorbereitung der Modulleistung   |                  |                                                                  |                                        |                                                |                                        | 0            |
| Workload by module                                         |             |                                  |                  |                                                                  |                                        | 150                                            |                                        | 150          |
| Total module workload                                      |             |                                  |                  |                                                                  |                                        |                                                |                                        | 150          |

## GEO.07239.02 - Land System Science 2: Climate and Ecosystems

GEO.07239.02

5 CP

|                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module label</b>                                | Land System Science 2: Climate and Ecosystems                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Module code</b>                                 | GEO.07239.02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Semester of first implementation</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Module used in courses of study / semesters</b> | <ul style="list-style-type: none"> <li>• Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Wahlpflichtmodule Nebenfächer</li> <li>• Biodiversity Sciences (MA120 LP) (Master) &gt; Biologie BiodiversityMA120, Version of accreditation valid from SS 2021 &gt; Project modules offered by the Institute of Geosciences and Geography (Nat Sci III)</li> <li>• International Area Studies - Global Change Geography (MA120 LP) (Master) &gt; Geographie/Erdkunde IntArStudGlobChaGeoMA120, Version of accreditation (SS 2021 - SoSe 2025) &gt; Schwerpunkt- oder Ergänzungsbereich: Land Systems Science (LSS)</li> <li>• Management natürlicher Ressourcen (MA120 LP) (Master) &gt; Landespflege/Landschaftsgestaltung Management nat.RessoMA120, Version of accreditation valid from WS 2021/22 &gt; Wahlpflichtbereich</li> </ul>                                                                              |
| <b>Responsible person for this module</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Further responsible persons</b>                 | Prof. Dr. Christopher Conrad                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Prerequisites</b>                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Skills to be acquired in this module</b>        | <ul style="list-style-type: none"> <li>• Vertiefendes Fachwissen zur Klimageographie und zu Klimawandel sammeln, erweitern und diskutieren</li> <li>• Messung von Klimavariablen und Modellierung von Klima beschreiben, interpretieren und im Kontext von Klimawandel bewerten</li> <li>• Ursache-Wirkungsgefügen zu Klimawandel, Auswirkungen und möglichen Anpassungsmaßnahmen (Mensch-Umwelt-Beziehung) selbständig analysieren</li> <li>• Klimatische Veränderungen auf verschiedene Ökosysteme und darin lebende und wirtschaftende Sektoren identifizieren, strukturiert beschreiben und diskutieren sowie hinsichtlich der Stärke und Art der Auswirkungen kategorisieren und einschätzen</li> <li>• Klimamessdaten und Projektionen selbständig analysieren</li> <li>• die Aussagekraft von Geodaten zu Klima- und Klimawandel anhand erworbener Kenntnisse zu Unsicherheiten und deren Quellen eigenständig und korrekt beurteilen</li> <li>• Unter Anleitung Quellcode für die Analyse von Klimaindikatoren entwickeln</li> </ul> |
| <b>Module contents</b>                             | <ul style="list-style-type: none"> <li>• Zusammenfassungen zu Klimageographie und Klimawandel</li> <li>• Hintergrundwissen Klimamodellierung: Technische Grundlagen, Modelltypen, Projektionen und Szenarios</li> <li>• Analyse der Ursache-Wirkungsketten hinsichtlich der Auswirkungen des Klimawandel auf verschiedene Ökosysteme und Sektoren anhand von Indikatoren und Indikatorensystemen</li> <li>• Technischer Zugang zu Datenportalen und Aufbereitung von Klimamessdaten und Klimaprojektionen</li> <li>• Analyse und Visualisierung von Klimadaten: Klimadiagramme, Häufigkeitsverteilungen, Trend- und Zusammenhangsanalysen</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Forms of instruction</b>                        | Lecture (2 SWS)<br>Tutorial (2 SWS)<br>Course<br>Course<br>Course                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Languages of instruction</b>                    | German, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Duration (semesters)</b>                        | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Module frequency</b>                            | jedes Wintersemester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

GEO.07239.02

5 CP

|                                                            |             |                                  |                    |                                                                  |                                        |                                  |                                        |              |
|------------------------------------------------------------|-------------|----------------------------------|--------------------|------------------------------------------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| Module capacity                                            |             |                                  |                    | unrestricted                                                     |                                        |                                  |                                        |              |
| Time of examination                                        |             |                                  |                    |                                                                  |                                        |                                  |                                        |              |
| Credit points                                              |             |                                  |                    | 5 CP                                                             |                                        |                                  |                                        |              |
| Share on module final degree                               |             |                                  |                    | Course 1: %; Course 2: %; Course 3: %; Course 4: %; Course 5: %. |                                        |                                  |                                        |              |
| Share of module grade on the course of study's final grade |             |                                  |                    | 1                                                                |                                        |                                  |                                        |              |
| Examination                                                |             |                                  | Exam prerequisites |                                                                  |                                        | Type of examination              |                                        |              |
| Course 1                                                   |             |                                  |                    |                                                                  |                                        |                                  |                                        |              |
| Course 2                                                   |             |                                  |                    |                                                                  |                                        |                                  |                                        |              |
| Course 3                                                   |             |                                  |                    |                                                                  |                                        |                                  |                                        |              |
| Course 4                                                   |             |                                  |                    |                                                                  |                                        |                                  |                                        |              |
| Course 5                                                   |             |                                  |                    |                                                                  |                                        |                                  |                                        |              |
| Final exam of module                                       |             |                                  | Übungsaufgabe(n)   |                                                                  |                                        | Hausarbeit oder Präsentation     |                                        |              |
| Exam repetition information                                |             |                                  |                    |                                                                  |                                        |                                  |                                        |              |
| Module course label                                        | Course type | Course title                     | SWS                | Workload of compulsory attendance                                | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| Course 1                                                   | Lecture     | Vorlesung                        |                    | 2                                                                |                                        |                                  |                                        | 0            |
| Course 2                                                   | Tutorial    | Tutorium                         |                    | 2                                                                |                                        |                                  |                                        | 0            |
| Course 3                                                   | Course      | Vor- und Nachbereitung Vorlesung |                    |                                                                  |                                        |                                  |                                        | 0            |
| Course 4                                                   | Course      | Bearbeitung von Übungsaufgaben   |                    |                                                                  |                                        |                                  |                                        | 0            |
| Course 5                                                   | Course      | Vorbereitung der Modulleistung   |                    |                                                                  |                                        |                                  |                                        | 0            |
| Workload by module                                         |             |                                  |                    |                                                                  |                                        |                                  | 150                                    | 150          |
| Total module workload                                      |             |                                  |                    |                                                                  |                                        |                                  |                                        | 150          |

## GEO.07216.03 - Digital Geography 1: Advanced Geodata Handling and Analysis

GEO.07216.03

5 CP

|                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module label</b>                                | Digital Geography 1: Advanced Geodata Handling and Analysis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Module code</b>                                 | GEO.07216.03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Semester of first implementation</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Module used in courses of study / semesters</b> | <ul style="list-style-type: none"> <li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Wahlpflichtmodule Nebenfächer</li> <li>Informatik (MA120 LP) (Master) &gt; Informatik InformatikMA120, Version of accreditation valid from SoSe 2023 &gt; Geographie</li> <li>International Area Studies - Global Change Geography (MA120 LP) (Master) &gt; Geographie/Erdkunde IntArStudGlobChaGeoMA120, Version of accreditation (SS 2021 - SoSe 2025) &gt; Schwerpunkt- oder Ergänzungsbereich: Digital Geography (DG)</li> <li>Management natürlicher Ressourcen (MA120 LP) (Master) &gt; Landespflege/Landschaftsgestaltung Management nat.RessoMA120, Version of accreditation valid from WS 2021/22 &gt; Wahlpflichtbereich</li> </ul> |
| <b>Responsible person for this module</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Further responsible persons</b>                 | Prof. Dr. Boris Michel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Prerequisites</b>                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Skills to be acquired in this module</b>        | <ul style="list-style-type: none"> <li>Studierende sind in der Lage, fortgeschrittene Verfahren der Geodatenanalyse selbstständig anzuwenden und zu bewerten.</li> <li>Studierende verstehen wesentliche Schritte der Erhebung, Analyse, Parametrisierung und Präsentation von räumlichen Datensätzen.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

### Module contents

- Vertiefende Kenntnisse der Geodatenanalyse
- Geodatendienste und Infrastrukturen
- Ausgewählte Beispiele der Geodaten-Anwendungen in verschiedenen räumlichen Skalenebenen
- Ausgewählte Beispiele der Geodaten-Anwendungen für verschiedene, geowissenschaftliche Anwendungen
- Urheber- und Nutzungsrechte
- Geostatistik
- Quantitative Methoden der Geographie
- Aktuelle Diskussionen in GIS und Geodatenanalyse

|                                                            |                                                                    |                     |
|------------------------------------------------------------|--------------------------------------------------------------------|---------------------|
| Forms of instruction                                       | Lecture (2 SWS)<br>Exercises (2 SWS)<br>Course<br>Course<br>Course |                     |
| Languages of instruction                                   | German, English                                                    |                     |
| Duration (semesters)                                       | 1 Semester Semester                                                |                     |
| Module frequency                                           | jedes Wintersemester                                               |                     |
| Module capacity                                            | unrestricted                                                       |                     |
| Time of examination                                        |                                                                    |                     |
| Credit points                                              | 5 CP                                                               |                     |
| Share on module final degree                               | Course 1: %; Course 2: %; Course 3: %; Course 4: %; Course 5: %.   |                     |
| Share of module grade on the course of study's final grade | 1                                                                  |                     |
| Examination                                                | Exam prerequisites                                                 | Type of examination |
| Course 1                                                   |                                                                    |                     |
| Course 2                                                   |                                                                    |                     |
| Course 3                                                   |                                                                    |                     |
| Course 4                                                   |                                                                    |                     |

| Examination                 |             |                                  | Exam prerequisites            |                                   |                                        | Type of examination              |                                        |              |
|-----------------------------|-------------|----------------------------------|-------------------------------|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| Course 5                    |             |                                  |                               |                                   |                                        |                                  |                                        |              |
| Final exam of module        |             |                                  | Erfüllung der Arbeitsaufträge |                                   |                                        | Klausur oder Portfolio           |                                        |              |
| Exam repetition information |             |                                  |                               |                                   |                                        |                                  |                                        |              |
| Module course label         | Course type | Course title                     | SWS                           | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| Course 1                    | Lecture     | Vorlesung                        |                               | 2                                 |                                        |                                  |                                        | 0            |
| Course 2                    | Exercises   | Computerübung                    |                               | 2                                 |                                        |                                  |                                        | 0            |
| Course 3                    | Course      | Vor- und Nachbereitung Vorlesung |                               |                                   |                                        |                                  |                                        | 0            |
| Course 4                    | Course      | Erfüllung der Arbeitsaufträge    |                               |                                   |                                        |                                  |                                        | 0            |
| Course 5                    | Course      | Vorbereitung Modulleistung       |                               |                                   |                                        |                                  |                                        | 0            |
| Workload by module          |             |                                  |                               |                                   |                                        | 150                              |                                        | 150          |
| Total module workload       |             |                                  |                               |                                   |                                        |                                  |                                        | 150          |

## GEO.07241.02 - Digital Geography 4: Advanced GIScience

|                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                          |
|------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| GEO.07241.02                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 5 CP                                                                     |
| Module label                                               | Digital Geography 4: Advanced GIScience                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                          |
| Module code                                                | GEO.07241.02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                          |
| Semester of first implementation                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                          |
| Module used in courses of study / semesters                | <ul style="list-style-type: none"> <li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Wahlpflichtmodule Nebenfächer</li> <li>Informatik (MA120 LP) (Master) &gt; Informatik InformatikMA120, Version of accreditation valid from SoSe 2023 &gt; Geographie</li> <li>International Area Studies - Global Change Geography (MA120 LP) (Master) &gt; Geographie/Erdkunde IntArStudGlobChaGeoMA120, Version of accreditation (SS 2021 - SoSe 2025) &gt; Schwerpunkt- oder Ergänzungsbereich: Digital Geography (DG)</li> <li>Management natürlicher Ressourcen (MA120 LP) (Master) &gt; Landespflege/Landschaftsgestaltung Management nat.RessoMA120, Version of accreditation valid from WS 2021/22 &gt; Wahlpflichtbereich</li> </ul> |                                                                          |
| Responsible person for this module                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                          |
| Further responsible persons                                | Prof. Dr. Boris Michel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                          |
| Prerequisites                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                          |
| Skills to be acquired in this module                       | <ul style="list-style-type: none"> <li>Die Studierenden lernen fortgeschrittene Kenntnisse zur digitalen, multiskalaren Analyse und Modellierung räumlicher Prozesse und Strukturen, können diese einschätzen und eigenständig anwenden.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                          |
| Module contents                                            | <ul style="list-style-type: none"> <li>Geodaten-Anwendungen in verschiedenen räumlichen Skalenebenen</li> <li>Parametrisierung von Geodaten in verschiedenen geowissenschaftlichen Anwendungen</li> <li>Erfassen-Verarbeiten-Analysieren-Präsentieren von Geodaten (EVAP-Konzept) im Rahmen von Forschungs- und anwendungsbezogenen GIS-Projekten</li> <li>Fortgeschrittene Visualisierungsmethoden</li> <li>GIS-Projekt-Management</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                          |
| Forms of instruction                                       | Seminar (2 SWS)<br>Course<br>Course                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                          |
| Languages of instruction                                   | German, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                          |
| Duration (semesters)                                       | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                          |
| Module frequency                                           | jedes Sommersemester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                          |
| Module capacity                                            | unrestricted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                          |
| Time of examination                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                          |
| Credit points                                              | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                          |
| Share on module final degree                               | Course 1: %; Course 2: %; Course 3: %.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                          |
| Share of module grade on the course of study's final grade | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                          |
| Examination                                                | Exam prerequisites                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Type of examination                                                      |
| Course 1                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                          |
| Course 2                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                          |
| Course 3                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                          |
| Final exam of module                                       | Erfüllung der Arbeitsaufträge                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Präsentation oder Seminarpräsentation oder Projektbericht oder Portfolio |
| Exam repetition information                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                          |

| Module course label          | Course type | Course title                   | SWS | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
|------------------------------|-------------|--------------------------------|-----|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| <b>Course 1</b>              | Seminar     | Seminar                        |     | 2                                 |                                        |                                  |                                        | 0            |
| <b>Course 2</b>              | Course      | Vor- und Nachbereitung Seminar |     |                                   |                                        |                                  |                                        | 0            |
| <b>Course 3</b>              | Course      | Vorbereitung der Modulleistung |     |                                   |                                        |                                  |                                        | 0            |
| <b>Workload by module</b>    |             |                                |     |                                   |                                        | 150                              |                                        | 150          |
| <b>Total module workload</b> |             |                                |     |                                   |                                        |                                  |                                        | 150          |

## PHY.00861.03 - Spektroskopische Methoden / ergphys\_B

|                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PHY.00861.03                                       | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Module label</b>                                | Spektroskopische Methoden / ergphys_B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Module code</b>                                 | PHY.00861.03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Semester of first implementation</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Module used in courses of study / semesters</b> | <ul style="list-style-type: none"> <li>• Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Wahlpflichtmodule Nebenfächer</li> <li>• Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation (WS 2006/07 - SS 2015) &gt; Wahlpflichtmodule Nebenfächer (Maximal 20 Leistungspunkte)</li> <li>• Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation (WS 2015/16 - SS 2018) &gt; Wahlpflichtmodule Nebenfächer (Maximal 20 Leistungspunkte)</li> <li>• Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation (WS 2018/19 - SS 2021) &gt; Wahlpflichtmodule Nebenfächer</li> <li>• Physik (180 LP) (Bachelor) &gt; Physik Physik180, Version of accreditation valid from WS 2019/20 &gt; Physikalische Ergänzungsmodule</li> <li>• Physik (180 LP) (Bachelor) &gt; Physik Physik180, Version of accreditation (WS 2006/07 - SS 2012) &gt; Physikalische Ergänzungsmodule</li> <li>• Physik (180 LP) (Bachelor) &gt; Physik Physik180, Version of accreditation (WS 2012/13 - SS 2019) &gt; Physikalische Ergänzungsmodule</li> <li>• Physik und Digitale Technologien (180 LP) (Bachelor) &gt; Physik Physik u. Dig. Tech. 180, Version of accreditation valid from WS 2019/20 &gt; Wahlobligatorische Ergänzungs-fächer</li> </ul> |
| <b>Responsible person for this module</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Further responsible persons</b>                 | Prof. Dr. Kay Saalwächter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Prerequisites</b>                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Skills to be acquired in this module</b>        | <ul style="list-style-type: none"> <li>• Überblick über spektroskopische Methoden mit engem Bezug zur Anwendung</li> <li>• Verständnis der zugrunde liegenden physikalischen Konzepte</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Module contents</b>                             | <ul style="list-style-type: none"> <li>• Energiebegriff, Energieskalen, elektromagnetisches Spektrum. Dispersion, Resonanz, Linienformtheorie</li> <li>• Funktionsweise und Technologie von Spektrometern</li> <li>• NMR, ESR, Mikrowellen, Terahertz-Spektroskopie, IR-Spektroskopie, Raman-Spektroskopie, Schwingungsspektroskopie, UV/VIS Spektroskopie, Röntgenspektroskopie (EXAFS) Elektronenspektroskopie (XFS) Ultrakurzzeit- Spektroskopie</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Forms of instruction</b>                        | Lecture (2 SWS)<br>Seminar (1 SWS)<br>Course                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Languages of instruction</b>                    | German, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Duration (semesters)</b>                        | 1 Semester Semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Module frequency</b>                            | jedes Sommersemester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Module capacity</b>                             | unrestricted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Time of examination</b>                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Credit points</b>                               | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Share on module final degree</b>                | Course 1: %; Course 2: %; Course 3: %.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

PHY.00861.03

5 CP

| Share of module grade on the course of study's final grade |             |                                                    |                    |                                   | 1                                      |                                  |                                        |              |
|------------------------------------------------------------|-------------|----------------------------------------------------|--------------------|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| Examination                                                |             |                                                    | Exam prerequisites |                                   |                                        | Type of examination              |                                        |              |
| Course 1                                                   |             |                                                    |                    |                                   |                                        |                                  |                                        |              |
| Course 2                                                   |             |                                                    |                    |                                   |                                        |                                  |                                        |              |
| Course 3                                                   |             |                                                    |                    |                                   |                                        |                                  |                                        |              |
| Final exam of module                                       |             |                                                    |                    |                                   | Klausur                                |                                  |                                        |              |
| Exam repetition information                                |             |                                                    |                    |                                   |                                        |                                  |                                        |              |
| Module course label                                        | Course type | Course title                                       | SWS                | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| Course 1                                                   | Lecture     | Vorlesung<br>Physikalisches<br>Ergänzungsfach<br>B |                    | 2                                 |                                        |                                  |                                        | 0            |
| Course 2                                                   | Seminar     | Seminar<br>Physikalisches<br>Ergänzungsfach<br>B   |                    | 1                                 |                                        |                                  |                                        | 0            |
| Course 3                                                   | Course      | Selbststudium                                      |                    |                                   |                                        |                                  |                                        | 0            |
| Workload by module                                         |             |                                                    |                    |                                   |                                        |                                  | 150                                    | 150          |
| Total module workload                                      |             |                                                    |                    |                                   |                                        |                                  |                                        | 150          |

## WIW.06824.03 - Geschäftsprozessmanagement

|                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| WIW.06824.03                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 5 CP |
| <b>Module label</b>                                | Geschäftsprozessmanagement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |
| <b>Module code</b>                                 | WIW.06824.03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |
| <b>Semester of first implementation</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |
| <b>Module used in courses of study / semesters</b> | <ul style="list-style-type: none"> <li>• Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Wahlpflichtmodule Nebenfächer</li> <li>• Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation (WS 2018/19 - SS 2021) &gt; Wahlpflichtmodule Nebenfächer</li> <li>• Betriebswirtschaftslehre (Business Studies) (180 LP) (Bachelor) &gt; Betriebswirtschaftslehre BWL (Business Studies)180, Version of accreditation valid from WS 2020/21 &gt; Wahlpflichtbereich</li> <li>• Business Economics (180 LP) (Bachelor) &gt; Betriebswirtschaftslehre BusinessEconomics180, Version of accreditation valid from WS 2020/21 &gt; Wahlpflichtbereich</li> <li>• Grundlagen Wirtschaftswissenschaften (Fundamental Economics and Management) (60 LP) (Bachelor) &gt; Wirtschaftswissenschaften Wirtschaftswiss60, Version of accreditation valid from WS 2020/21 &gt; 2. Erweiterungen more...</li> <li>• Informatik (180 LP) (Bachelor) &gt; Informatik Informatik180, Version of accreditation valid from SS 2021 &gt; Bereich Betriebswirtschaftslehre</li> <li>• Informatik (180 LP) (Bachelor) &gt; Informatik Informatik180, Version of accreditation valid from SS 2021 &gt; Bereich Wirtschaftsinformatik</li> <li>• Informatik (180 LP) (Bachelor) &gt; Informatik Informatik180, Version of accreditation (WS 2018/19 - WS 2022/23) &gt; Bereich Volkswirtschaftslehre</li> <li>• Volkswirtschaftslehre (Economics) (180 LP) (Bachelor) &gt; Volkswirtschaftslehre VWL (Economics)180, Version of accreditation valid from WS 2020/21 &gt; Wahlpflichtbereich</li> <li>• Wirtschaftsinformatik (Business Information Systems) (180 LP) (Bachelor) &gt; Wirtschaftsinformatik Wirtschaftsinformatik180, Version of accreditation valid from WS 2020/21 &gt; Pflichtmodule</li> <li>• Wirtschaftswissenschaften (Economics and Management) (120 LP) (Bachelor) &gt; Wirtschaftswissenschaften Wirtschaftswiss120, Version of accreditation valid from WS 2020/21 &gt; 2. Erweiterungen</li> </ul> |      |
| <b>Responsible person for this module</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |
| <b>Further responsible persons</b>                 | Prof. Dr. Stefan Sackmann                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |
| <b>Prerequisites</b>                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |
| <b>Skills to be acquired in this module</b>        | <p>Die Studierenden wissen um die hohe Bedeutung der Prozessorientierung für die Gestaltung von Organisationen. Sie kennen die Entwicklung der Organisationstheorie hin zum heutigen Geschäftsprozessmanagement (GPM) und wichtige Anwendungsfelder des GPM. Die Studierenden erkennen die Notwendigkeit einer multi-perspektivischen Unternehmensmodellierung und verstehen die zentralen Grundlagen der System- und Modellierungstheorie. Die Modellierung von Geschäftsprozessen wird als zentrale Grundlage für das GPM erkannt und kann in den Lebenszyklus des GPM eingeordnet werden. Die Studierenden haben einen Überblick über unterschiedliche Ansätze zur Modellierung von Geschäftsprozessen und sind in der Lage, selbständig Ist- und Soll-Geschäftsprozessmodelle einfacher bis mittlerer Komplexität methodisch und unter Verwendung verschiedener Modellierungssprachen und -werkzeuge zu modellieren. Darüber hinaus werden einfache Verfahren zur Analyse und Verbesserung von Geschäftsprozessen sowie die Grundlagen von Process-aware Information Systems (PAIS) besprochen.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |
| <b>Module contents</b>                             | <ul style="list-style-type: none"> <li>• Organisation und organisatorischer Wandel, Grundlagen und Entwicklung der Prozessorganisation</li> <li>• Geschäftsprozessmanagement (GPM): Ziele, Vorgehen, Aufgaben</li> <li>• Lebenszyklus des GPM: Anforderungen, Methoden, Werkzeuge</li> <li>• Grundlagen der System- und Modellierungstheorie</li> <li>• Meta-Modell zur multi-perspektivischen Modellierung von Geschäftsprozessen</li> <li>• Modellierung von Geschäftsprozessen mit eEPK, BPMN und Petri-Netzen</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |

- Grundlagen der methodischen Prozessanalyse und -verbesserung
- Grundlagen der IT-Unterstützung durch Process-aware Information Systems (PAIS)
- Aktuelle Herausforderungen und Forschung im Bereich GPM
- Fallstudien zum GPM/Praxisbeispiele

|                                                            |             |                                       |                    |                                   |                                                                               |                                  |                                        |              |
|------------------------------------------------------------|-------------|---------------------------------------|--------------------|-----------------------------------|-------------------------------------------------------------------------------|----------------------------------|----------------------------------------|--------------|
| Forms of instruction                                       |             |                                       |                    |                                   | Lecture (2 SWS)<br>Course<br>Course<br>Exercises (2 SWS)<br>Course<br>Course  |                                  |                                        |              |
| Languages of instruction                                   |             |                                       |                    |                                   | German, English                                                               |                                  |                                        |              |
| Duration (semesters)                                       |             |                                       |                    |                                   | 1 Semester Semester                                                           |                                  |                                        |              |
| Module frequency                                           |             |                                       |                    |                                   | jedes Sommersemester                                                          |                                  |                                        |              |
| Module capacity                                            |             |                                       |                    |                                   | unrestricted                                                                  |                                  |                                        |              |
| Time of examination                                        |             |                                       |                    |                                   |                                                                               |                                  |                                        |              |
| Credit points                                              |             |                                       |                    |                                   | 5 CP                                                                          |                                  |                                        |              |
| Share on module final degree                               |             |                                       |                    |                                   | Course 1: %; Course 2: %; Course 3: %; Course 4: %; Course 5: %; Course 6: %. |                                  |                                        |              |
| Share of module grade on the course of study's final grade |             |                                       |                    |                                   | 1                                                                             |                                  |                                        |              |
| Examination                                                |             |                                       | Exam prerequisites |                                   | Type of examination                                                           |                                  |                                        |              |
| Course 1                                                   |             |                                       |                    |                                   |                                                                               |                                  |                                        |              |
| Course 2                                                   |             |                                       |                    |                                   |                                                                               |                                  |                                        |              |
| Course 3                                                   |             |                                       |                    |                                   |                                                                               |                                  |                                        |              |
| Course 4                                                   |             |                                       |                    |                                   |                                                                               |                                  |                                        |              |
| Course 5                                                   |             |                                       |                    |                                   |                                                                               |                                  |                                        |              |
| Course 6                                                   |             |                                       |                    |                                   |                                                                               |                                  |                                        |              |
| Final exam of module                                       |             |                                       |                    |                                   | Klausur                                                                       |                                  |                                        |              |
| Exam repetition information                                |             |                                       |                    |                                   |                                                                               |                                  |                                        |              |
| Module course label                                        | Course type | Course title                          | SWS                | Workload of compulsory attendance | Workload of preparation / homework etc                                        | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| Course 1                                                   | Lecture     | Vorlesung                             |                    | 2                                 |                                                                               |                                  |                                        | 0            |
| Course 2                                                   | Course      | Selbststudium für die Vorlesung       |                    |                                   |                                                                               |                                  |                                        | 0            |
| Course 3                                                   | Course      | Erarbeitung von Übungen / Fallstudien |                    |                                   |                                                                               |                                  |                                        | 0            |
| Course 4                                                   | Exercises   | Übung am PC unter Anleitung           |                    | 2                                 |                                                                               |                                  |                                        | 0            |
| Course 5                                                   | Course      | Selbststudium für die Übung           |                    |                                   |                                                                               |                                  |                                        | 0            |
| Course 6                                                   | Course      | Prüfungsvorbereitung                  |                    |                                   |                                                                               |                                  |                                        | 0            |
| Workload by module                                         |             |                                       |                    |                                   |                                                                               | 150                              |                                        | 150          |
| Total module workload                                      |             |                                       |                    |                                   |                                                                               |                                  |                                        | 150          |

## AGE.06080.05 - Soils under warm and cold climate

AGE.06080.05

5 CP

|                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module label</b>                                | Soils under warm and cold climate                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Module code</b>                                 | AGE.06080.05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Semester of first implementation</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Module used in courses of study / semesters</b> | <ul style="list-style-type: none"> <li>• Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Wahlpflichtmodule Nebenfächer</li> <li>• Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation (WS 2018/19 - SS 2021) &gt; Wahlpflichtmodule Nebenfächer</li> <li>• Management natürlicher Ressourcen (MA120 LP) (Master) &gt; Landespflege/Landschaftsgestaltung Management nat.RessoMA120, Version of accreditation valid from WS 2021/22 &gt; Wahlpflichtbereich</li> <li>• Management natürlicher Ressourcen (MA120 LP) (Master) &gt; Landespflege/Landschaftsgestaltung Management nat.RessoMA120, Version of accreditation (WS 2015/16 - SS 2018) &gt; Wahlpflichtmodule</li> <li>• Management natürlicher Ressourcen (MA120 LP) (Master) &gt; Landespflege/Landschaftsgestaltung Management nat.RessoMA120, Version of accreditation (WS 2018/19 - SS 2021) &gt; Wahlpflichtmodule (60 LP - empfohlen werden im 1., 2. und 3. Semester je 20 LP)</li> </ul> |
| <b>Responsible person for this module</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Further responsible persons</b>                 | Prof. Dr. Robert Mikutta                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Prerequisites</b>                               | Bodenkunde                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Skills to be acquired in this module</b>        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

- Nach dem Besuch des Moduls wird erwartet, dass die Studierenden in der Lage sind:
- Es soll die Vielfalt der Böden und ihrer regelhaften Anordnung in Landschaften verschiedener Ökozonen der Erde erkannt werden. Dabei sollen Kenntnisse über die wichtigsten Böden (nach international gebräuchlichen Klassifikationssystemen), die in der Pedosphäre ablaufenden Prozesse, daraus resultierender ökologischer Standorteigenschaften, Nutzungseignung und

Problemen bei der Nutzung vermittelt werden.

- es soll erkannt werden, dass die Nutzungseignung und Tragfähigkeit von Standorten begrenzt ist und hieraus standörtlich spezifische Nutzungsprobleme mit Ressourcenverbrauch/-zerstörung erwachsen und spezielle Problemlösungen erfordern.

### Module contents

- Es werden verschiedene Ökozonen der Erde mit ihren wichtigsten Böden (immerfeuchte Tropen, sommerfeuchte Tropen, subtropische Trockengebiete, trockene Mittelbreiten, winterfeuchte Subtropen, Mittelbreiten und kalte Klimate) exemplarisch dargestellt, ergänzt mit Reisböden und Andosols sowie Ausführungen zum Stoffhaushalt von Landschaften. Dabei werden verschiedene Definitionen, allgemeine bodenkundliche Grundlagen sowie bodengenetische, bodensystematische und standortkundliche Anwendungen an Fallbeispielen erläutert.
- Es werden die Nutzungsbeschränkungen der Bodenressourcen sowie Möglichkeiten der Nutzung von Bodeninformationen in der Land Evaluation dargestellt. In einführenden Vorlesungsteilen und Seminarbeiträgen werden spezifische Nutzungsprobleme und Lösungsmöglichkeiten (Nährstoffmangel, Trockenheit, Bewässerung, Versalzung, Bodenerosion, Desertifikation, Agroforestry u.s.w.) erörtert.

### Forms of instruction

Lecture (2 SWS)  
Seminar (2 SWS)  
Lecture (1 SWS)  
Course

AGE.06080.05

5 CP

|                                                            |             |                             |                    | Course                                                           |                                        |                                                                           |                                        |              |
|------------------------------------------------------------|-------------|-----------------------------|--------------------|------------------------------------------------------------------|----------------------------------------|---------------------------------------------------------------------------|----------------------------------------|--------------|
| Languages of instruction                                   |             |                             |                    | German, English                                                  |                                        |                                                                           |                                        |              |
| Duration (semesters)                                       |             |                             |                    | 1 Semester Semester                                              |                                        |                                                                           |                                        |              |
| Module frequency                                           |             |                             |                    | jedes Wintersemester                                             |                                        |                                                                           |                                        |              |
| Module capacity                                            |             |                             |                    | unrestricted                                                     |                                        |                                                                           |                                        |              |
| Time of examination                                        |             |                             |                    |                                                                  |                                        |                                                                           |                                        |              |
| Credit points                                              |             |                             |                    | 5 CP                                                             |                                        |                                                                           |                                        |              |
| Share on module final degree                               |             |                             |                    | Course 1: %; Course 2: %; Course 2: %; Course 3: %; Course 4: %. |                                        |                                                                           |                                        |              |
| Share of module grade on the course of study's final grade |             |                             |                    | 1                                                                |                                        |                                                                           |                                        |              |
| Examination                                                |             |                             | Exam prerequisites |                                                                  |                                        | Type of examination                                                       |                                        |              |
| Course 1                                                   |             |                             |                    |                                                                  |                                        |                                                                           |                                        |              |
| Course 2                                                   |             |                             |                    |                                                                  |                                        |                                                                           |                                        |              |
| Course 2                                                   |             |                             |                    |                                                                  |                                        |                                                                           |                                        |              |
| Course 3                                                   |             |                             |                    |                                                                  |                                        |                                                                           |                                        |              |
| Course 4                                                   |             |                             |                    |                                                                  |                                        |                                                                           |                                        |              |
| Final exam of module                                       |             |                             | Seminarbeitrag     |                                                                  |                                        | Klausur oder Hausarbeit oder mündliche Prüfung oder elektronische Klausur |                                        |              |
| Exam repetition information                                |             |                             |                    |                                                                  |                                        |                                                                           |                                        |              |
| Module course label                                        | Course type | Course title                | SWS                | Workload of compulsory attendance                                | Workload of preparation / homework etc | Workload of independent learning                                          | Workload (examination and preparation) | Sum workload |
| Course 1                                                   | Lecture     | Vorlesung (Böden)           |                    | 2                                                                |                                        |                                                                           |                                        | 0            |
| Course 2                                                   | Seminar     | Seminar                     |                    | 2                                                                |                                        |                                                                           |                                        | 0            |
| Course 2                                                   | Lecture     | Vorlesung (Klima)           |                    | 1                                                                |                                        |                                                                           |                                        | 0            |
| Course 3                                                   | Course      | Ausarbeitung Seminarbeitrag |                    |                                                                  |                                        |                                                                           |                                        | 0            |
| Course 4                                                   | Course      | Selbststudium               |                    |                                                                  |                                        |                                                                           |                                        | 0            |
| Workload by module                                         |             |                             |                    |                                                                  |                                        |                                                                           | 150                                    | 150          |
| Total module workload                                      |             |                             |                    |                                                                  |                                        |                                                                           |                                        | 150          |

## WIW.06799.03 - Environmental Economics

|                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| WIW.06799.03                                       | 5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Module label</b>                                | Environmental Economics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Module code</b>                                 | WIW.06799.03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Semester of first implementation</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Module used in courses of study / semesters</b> | <ul style="list-style-type: none"> <li>• Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Wahlpflichtmodule Nebenfächer</li> <li>• Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation (WS 2018/19 - SS 2021) &gt; Wahlpflichtmodule Nebenfächer</li> <li>• Betriebswirtschaftslehre (Business Studies) (MA120 LP) (Master) &gt; Betriebswirtschaftslehre BWL (Business Stud.)MA120, Version of accreditation valid from WiSe 2023/24 &gt; 2.1.1. Wahlbereich Operations Management</li> <li>• Betriebswirtschaftslehre (Business Studies) (MA120 LP) (Master) &gt; Betriebswirtschaftslehre BWL (Business Stud.)MA120, Version of accreditation (WS 2019/20 - SoSe 2023) &gt; 2.2.1 Wahlbereich Produktion und Logistik</li> <li>• Betriebswirtschaftslehre (Business Studies) (MA120 LP) (Master) &gt; Betriebswirtschaftslehre BWL (Business Stud.)MA120, Version of accreditation (WS 2019/20 - SoSe 2023) &gt; 3.2.1 Wahlbereich Produktion und Logistik more...</li> <li>• Betriebswirtschaftslehre (Business Studies) (MA120 LP) (Master) &gt; Betriebswirtschaftslehre BWL (Business Stud.)MA120, Version of accreditation (WS 2019/20 - SoSe 2023) &gt; 3.5.1 Wahlbereich Wirtschafts- und Unternehmensethik</li> <li>• Economics: Data Science and Policy (MA120 LP) (Master) &gt; Volkswirtschaftslehre Economics MA120, Version of accreditation valid from WS 2019/20 &gt; 2.1 Elective Modules</li> <li>• Economics: Data Science and Policy (MA120 LP) (Master) &gt; Volkswirtschaftslehre Economics MA120, Version of accreditation valid from WS 2019/20 &gt; 3. Electives</li> <li>• Erneuerbare Energien (MA120 LP) (Master) &gt; Regenerative Energien Erneuerbare EnergienMA120, Version of accreditation valid from WS 2015/16 &gt; Wahlpflichtfach Wirtschaftswissenschaften</li> <li>• Europäische und internationale Wirtschaft (MA120 LP) (Master) &gt; Volkswirtschaftslehre Eur.u.int.Wirtsch.MA120, Version of accreditation valid from WS 2020/21 &gt; 1.1.1. Wirtschaftswissenschaften</li> <li>• Europäische und internationale Wirtschaft (MA120 LP) (Master) &gt; Volkswirtschaftslehre Eur.u.int.Wirtsch.MA120, Version of accreditation valid from WS 2020/21 &gt; 2.2.1. Wirtschaftswissenschaften</li> <li>• Informatik (MA120 LP) (Master) &gt; Informatik InformatikMA120, Version of accreditation valid from SoSe 2023 &gt; Volkswirtschaftslehre</li> <li>• Informatik (MA120 LP) (Master) &gt; Informatik InformatikMA120, Version of accreditation (WS 2016/17 - WS 2022/23) &gt; Volkswirtschaftslehre</li> <li>• International Area Studies - Global Change Geography (MA120 LP) (Master) &gt; Geographie/Erdkunde IntArStudGlobChaGeoMA120, Version of accreditation (SS 2021 - SoSe 2025) &gt; Economics</li> <li>• International Area Studies (MA120 LP) (Master) &gt; Geographie/Erdkunde Intern. Area StudiesMA120, Version of accreditation (SS 2019 - SoSe 2024) &gt; Wirtschaftswissenschaften</li> <li>• Politikwissenschaft () (Master) &gt; Politikwissenschaft/Politologie PolitikwissenschaftMA4575, Version of accreditation valid from WiSe 2023/24 &gt; 2 Interdisziplinärer Wahlpflichtbereich</li> <li>• Politikwissenschaft: Parlamentsfragen und Zivilgesellschaft (MA120 LP) (Master) &gt; Politikwissenschaft/Politologie PolitikwParlamentZivMA120, Version of accreditation valid from WiSe 2023/24 &gt; Wahlpflichtbereich B Interdisziplinäre Module</li> <li>• Politikwissenschaft: Parlamentsfragen und Zivilgesellschaft (MA120 LP) (Master) &gt; Politikwissenschaft/Politologie PolitikwParlamentZivMA120, Version of accreditation (WS 2014/15 - SoSe 2023) &gt; Wahlpflichtbereich Ökonomie</li> </ul> |
| <b>Responsible person for this module</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Further responsible persons</b>                 | Prof. Dr. Bernd Hansjürgens                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Prerequisites</b>                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

**Skills to be acquired in this module**

- Vertiefung ausgewählter ökonomischer Aspekte der Umweltpolitik
- Fähigkeiten und Kenntnisse zur Lösung von praktisch relevanten umweltökonomischen Problemen
- Befähigung zur Anwendung ökonomischen Wissens in konkreten umweltpolitischen Entscheidungen
- Auswertung und kritische Reflexion einschlägiger Forschungsliteratur

**Module contents**

- Umwelt als öffentliches Gut; externe Effekte
- Coase- versus Pigou-Ansatz in der Umweltökonomik
- Umweltökonomische Bewertung (Theorie, Ansätze, Instrumente)
- Instrumente der Umweltpolitik (insbesondere ökonomische Anreizinstrumente)
- Umwelt und öffentliche Entscheidungsfindung (Neue Politische Ökonomie)

**Forms of instruction**

Lecture (2 SWS)  
Course  
Course

**Languages of instruction**

German, English

**Duration (semesters)**

1 Semester Semester

**Module frequency**

jedes Sommersemester

**Module capacity**

unrestricted

**Time of examination**
**Credit points**

5 CP

**Share on module final degree**

Course 1: %; Course 2: %; Course 3: %.

**Share of module grade on the course of study's final grade**

1

**Examination**
**Exam prerequisites**
**Type of examination**
**Course 1**
**Course 2**
**Course 3**
**Final exam of module**

Klausur

**Exam repetition information**

| Module course label          | Course type | Course title         | SWS | Workload of compulsory attendance | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
|------------------------------|-------------|----------------------|-----|-----------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| <b>Course 1</b>              | Lecture     | Vorlesung            |     | 2                                 |                                        |                                  |                                        | 0            |
| <b>Course 2</b>              | Course      | Selbststudium        |     |                                   |                                        |                                  |                                        | 0            |
| <b>Course 3</b>              | Course      | Prüfungsvorbereitung |     |                                   |                                        |                                  |                                        | 0            |
| <b>Workload by module</b>    |             |                      |     |                                   |                                        | 150                              |                                        | 150          |
| <b>Total module workload</b> |             |                      |     |                                   |                                        |                                  |                                        | 150          |

## CHE.00200.03 - Umweltchemie

CHE.00200.03

5 CP

|                                         |              |
|-----------------------------------------|--------------|
| <b>Module label</b>                     | Umweltchemie |
| <b>Module code</b>                      | CHE.00200.03 |
| <b>Semester of first implementation</b> |              |

**Module used in courses of study / semesters**

- Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) > Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 > Wahlpflichtmodule Nebenfächer
- Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) > Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation (WS 2006/07 - SS 2015) > Wahlpflichtmodule Nebenfächer (Maximal 20 Leistungspunkte)
- Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) > Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation (WS 2015/16 - SS 2018) > Wahlpflichtmodule Nebenfächer (Maximal 20 Leistungspunkte)
- Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) > Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation (WS 2018/19 - SS 2021) > Wahlpflichtmodule Nebenfächer
- Ernährungswissenschaften (MA120 LP) (Master) > Ernährungswissenschaft Ernährungswiss.MA120, Version of accreditation (WS 2015/16 - SS 2020) > Wahlbereich (10 LP) more...
- Ernährungswissenschaften (MA120 LP) (Master) > Ernährungswissenschaft Ernährungswiss.MA120, Version of accreditation (WS 2020/21 - SoSe 2023) > Wahlbereich (15 LP)
- Informatik (MA120 LP) (Master) > Informatik InformatikMA120, Version of accreditation valid from SoSe 2023 > Chemie
- Informatik (MA120 LP) (Master) > Informatik InformatikMA120, Version of accreditation (WS 2006/07 - SS 2013) > Chemie
- Informatik (MA120 LP) (Master) > Informatik InformatikMA120, Version of accreditation (WS 2013/14 - SS 2016) > Chemie
- Informatik (MA120 LP) (Master) > Informatik InformatikMA120, Version of accreditation (WS 2016/17 - WS 2022/23) > Chemie
- Lebensmittelchemie () (Andere) > Lebensmittelchemie Lebensmittelchemie, Version of accreditation valid from WS 2019/20 > Pflichtmodule
- Management natürlicher Ressourcen (180 LP) (Bachelor) > Landespflge/Landschaftsgestaltung Management nat.Ressour180, Version of accreditation valid from WS 2021/22 > Fachliche Vertiefungsmodule (30 LP)
- Management natürlicher Ressourcen (180 LP) (Bachelor) > Landespflge/Landschaftsgestaltung Management nat.Ressour180, Version of accreditation (WS 2006/07 - SS 2013) > Fachliche Vertiefungsmodule
- Management natürlicher Ressourcen (180 LP) (Bachelor) > Landespflge/Landschaftsgestaltung Management nat.Ressour180, Version of accreditation (WS 2013/14 - SS 2015) > Fachliche Vertiefungsmodule (20 LP)
- Management natürlicher Ressourcen (180 LP) (Bachelor) > Landespflge/Landschaftsgestaltung Management nat.Ressour180, Version of accreditation (WS 2015/16 - SS 2018) > Fachliche Vertiefungsmodule (20 LP)
- Management natürlicher Ressourcen (180 LP) (Bachelor) > Landespflge/Landschaftsgestaltung Management nat.Ressour180, Version of accreditation (WS 2018/19 - SS 2021) > Fachliche Vertiefungsmodule (30 LP)
- Physik (MA120 LP) (Master) > Physik PhysikMA120, Version of accreditation valid from WS 2019/20 > Nichtphysikalische Wahlpflichtmodule
- Physik (MA120 LP) (Master) > Physik PhysikMA120, Version of accreditation (WS 2009/10 - SS 2019) > Wahlpflichtmodule

**Responsible person for this module**

**Further responsible persons**

Prof. Dr. Kai-Uwe Goss

**Prerequisites**

**Skills to be acquired in this module**

CHE.00200.03

5 CP

- Beherrschen der Grundlagen der Umweltchemie und Ökotoxikologie
- Anwenden und Beherrschen von Methoden der Umweltforschung

#### Module contents

- Umweltchemie und Ökotoxikologie
- Umweltmedien und Methoden der Umweltforschung
- Umweltmedien, Stoffbezogene Konzepte, Fallbeispiele

|                                                            |             |               |                                |                                                        |                                        |                                  |                                        |              |
|------------------------------------------------------------|-------------|---------------|--------------------------------|--------------------------------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| Forms of instruction                                       |             |               |                                | Lecture (2 SWS)<br>Course<br>Lecture (2 SWS)<br>Course |                                        |                                  |                                        |              |
| Languages of instruction                                   |             |               |                                | German, English                                        |                                        |                                  |                                        |              |
| Duration (semesters)                                       |             |               |                                | 2 Semester Semester                                    |                                        |                                  |                                        |              |
| Module frequency                                           |             |               |                                | jedes Studienjahr beginnend im Wintersemester          |                                        |                                  |                                        |              |
| Module capacity                                            |             |               |                                | unrestricted                                           |                                        |                                  |                                        |              |
| Time of examination                                        |             |               |                                |                                                        |                                        |                                  |                                        |              |
| Credit points                                              |             |               |                                | 5 CP                                                   |                                        |                                  |                                        |              |
| Share on module final degree                               |             |               |                                | Course 1: %; Course 2: %; Course 3: %; Course 4: %.    |                                        |                                  |                                        |              |
| Share of module grade on the course of study's final grade |             |               |                                | 1                                                      |                                        |                                  |                                        |              |
| Examination                                                |             |               | Exam prerequisites             |                                                        |                                        | Type of examination              |                                        |              |
| Course 1                                                   |             |               |                                |                                                        |                                        |                                  |                                        |              |
| Course 2                                                   |             |               |                                |                                                        |                                        |                                  |                                        |              |
| Course 3                                                   |             |               |                                |                                                        |                                        |                                  |                                        |              |
| Course 4                                                   |             |               |                                |                                                        |                                        |                                  |                                        |              |
| Final exam of module                                       |             |               | Anwesenheit in den Vorlesungen |                                                        |                                        | mündl. Prüfung oder Klausur      |                                        |              |
| Exam repetition information                                |             |               |                                |                                                        |                                        |                                  |                                        |              |
| Module course label                                        | Course type | Course title  | SWS                            | Workload of compulsory attendance                      | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| Course 1                                                   | Lecture     | Vorlesung     | 2                              |                                                        |                                        |                                  |                                        | 0            |
| Course 2                                                   | Course      | Selbststudium |                                |                                                        |                                        |                                  |                                        | 0            |
| Course 3                                                   | Lecture     | Vorlesung     | 2                              |                                                        |                                        |                                  |                                        | 0            |
| Course 4                                                   | Course      | Selbststudium |                                |                                                        |                                        |                                  |                                        | 0            |
| Workload by module                                         |             |               |                                |                                                        |                                        | 150                              |                                        | 150          |
| Total module workload                                      |             |               |                                |                                                        |                                        |                                  |                                        | 150          |

## CHE.05968.01 - Analytische Chemie im Nebenfach (AnC-N)

CHE.05968.01

5 CP

**Module label** Analytische Chemie im Nebenfach (AnC-N)

**Module code** CHE.05968.01

**Semester of first implementation**

**Module used in courses of study / semesters**

- Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) > Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 > Wahlpflichtmodule Nebenfächer
- Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) > Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation (WS 2015/16 - SS 2018) > Wahlpflichtmodule Nebenfächer (Maximal 20 Leistungspunkte)
- Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) > Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation (WS 2018/19 - SS 2021) > Wahlpflichtmodule Nebenfächer
- Informatik (MA120 LP) (Master) > Informatik InformatikMA120, Version of accreditation valid from SoSe 2023 > Chemie
- Informatik (MA120 LP) (Master) > Informatik InformatikMA120, Version of accreditation (WS 2013/14 - SS 2016) > Chemie more...
- Informatik (MA120 LP) (Master) > Informatik InformatikMA120, Version of accreditation (WS 2016/17 - WS 2022/23) > Chemie
- Management natürlicher Ressourcen (180 LP) (Bachelor) > Landespflege/Landschaftsgestaltung Management nat.Ressour180, Version of accreditation valid from WS 2021/22 > Fachliche Vertiefungsmodule (30 LP)
- Management natürlicher Ressourcen (180 LP) (Bachelor) > Landespflege/Landschaftsgestaltung Management nat.Ressour180, Version of accreditation (WS 2015/16 - SS 2018) > Fachliche Vertiefungsmodule (20 LP)
- Management natürlicher Ressourcen (180 LP) (Bachelor) > Landespflege/Landschaftsgestaltung Management nat.Ressour180, Version of accreditation (WS 2018/19 - SS 2021) > Fachliche Vertiefungsmodule (30 LP)
- Physik (MA120 LP) (Master) > Physik PhysikMA120, Version of accreditation valid from WS 2019/20 > Nichtphysikalische Wahlpflichtmodule
- Physik (MA120 LP) (Master) > Physik PhysikMA120, Version of accreditation (WS 2009/10 - SS 2019) > Wahlpflichtmodule

**Responsible person for this module**

**Further responsible persons** Prof. Dr. Daniel Wefers

**Prerequisites**

**Skills to be acquired in this module**

- Grundlagen der Denk- und Arbeitsweise der Analytischen Chemie
- Konzepte und Strategien und Qualitätssicherung
- Analytische Nutzung chemischer und elektrochemischer Gleichgewichte
- Summenparameter (Auswahl)
- Methoden der Instrumentellen Analytischen Chemie
- Anorganische und organische Spurenanalytik

**Module contents**

- Grundlagen der Analytischen Chemie
- Qualitätssicherung
- Instrumentelle Analytische Chemie
- Konzentrationsanalytik

**Forms of instruction**

Lecture (1 SWS)  
Course  
Seminar (1 SWS)  
Course  
Lecture (2 SWS)

CHE.05968.01

5 CP

|                                                            |             |               |                    | Course                                                                        |                                        |                                  |                                        |              |
|------------------------------------------------------------|-------------|---------------|--------------------|-------------------------------------------------------------------------------|----------------------------------------|----------------------------------|----------------------------------------|--------------|
| Languages of instruction                                   |             |               |                    | German, English                                                               |                                        |                                  |                                        |              |
| Duration (semesters)                                       |             |               |                    | 1 Semester Semester                                                           |                                        |                                  |                                        |              |
| Module frequency                                           |             |               |                    | jedes Wintersemester                                                          |                                        |                                  |                                        |              |
| Module capacity                                            |             |               |                    | unrestricted                                                                  |                                        |                                  |                                        |              |
| Time of examination                                        |             |               |                    |                                                                               |                                        |                                  |                                        |              |
| Credit points                                              |             |               |                    | 5 CP                                                                          |                                        |                                  |                                        |              |
| Share on module final degree                               |             |               |                    | Course 1: %; Course 2: %; Course 3: %; Course 4: %; Course 5: %; Course 6: %. |                                        |                                  |                                        |              |
| Share of module grade on the course of study's final grade |             |               |                    | 1                                                                             |                                        |                                  |                                        |              |
| Examination                                                |             |               | Exam prerequisites |                                                                               |                                        | Type of examination              |                                        |              |
| Course 1                                                   |             |               |                    |                                                                               |                                        |                                  |                                        |              |
| Course 2                                                   |             |               |                    |                                                                               |                                        |                                  |                                        |              |
| Course 3                                                   |             |               |                    |                                                                               |                                        |                                  |                                        |              |
| Course 4                                                   |             |               |                    |                                                                               |                                        |                                  |                                        |              |
| Course 5                                                   |             |               |                    |                                                                               |                                        |                                  |                                        |              |
| Course 6                                                   |             |               |                    |                                                                               |                                        |                                  |                                        |              |
| Final exam of module                                       |             |               |                    | mündl. Prüfung oder Klausur                                                   |                                        |                                  |                                        |              |
| Exam repetition information                                |             |               |                    |                                                                               |                                        |                                  |                                        |              |
| Module course label                                        | Course type | Course title  | SWS                | Workload of compulsory attendance                                             | Workload of preparation / homework etc | Workload of independent learning | Workload (examination and preparation) | Sum workload |
| Course 1                                                   | Lecture     | Vorlesung     |                    | 1                                                                             |                                        |                                  |                                        | 0            |
| Course 2                                                   | Course      | Selbststudium |                    |                                                                               |                                        |                                  |                                        | 0            |
| Course 3                                                   | Seminar     | Seminar       |                    | 1                                                                             |                                        |                                  |                                        | 0            |
| Course 4                                                   | Course      | Selbststudium |                    |                                                                               |                                        |                                  |                                        | 0            |
| Course 5                                                   | Lecture     | Vorlesung     |                    | 2                                                                             |                                        |                                  |                                        | 0            |
| Course 6                                                   | Course      | Selbststudium |                    |                                                                               |                                        |                                  |                                        | 0            |
| Workload by module                                         |             |               |                    |                                                                               |                                        | 150                              |                                        | 150          |
| Total module workload                                      |             |               |                    |                                                                               |                                        |                                  |                                        | 150          |

## Wahlmodule

### GEO.07408.01 - Wahlmodul 1

|                                                            |                                                                                                                                                                                                                                         |                     |
|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| GEO.07408.01                                               |                                                                                                                                                                                                                                         | 5 CP                |
| Module label                                               | Wahlmodul 1                                                                                                                                                                                                                             |                     |
| Module code                                                | GEO.07408.01                                                                                                                                                                                                                            |                     |
| Semester of first implementation                           |                                                                                                                                                                                                                                         |                     |
| Module used in courses of study / semesters                | <ul style="list-style-type: none"><li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Wahlmodule</li></ul> |                     |
| Responsible person for this module                         |                                                                                                                                                                                                                                         |                     |
| Further responsible persons                                | Prüfungsausschussvorsitz                                                                                                                                                                                                                |                     |
| Prerequisites                                              |                                                                                                                                                                                                                                         |                     |
| Skills to be acquired in this module                       | <ul style="list-style-type: none"><li>je nach Wahl</li></ul>                                                                                                                                                                            |                     |
| Module contents                                            | <ul style="list-style-type: none"><li>je nach Wahl</li></ul>                                                                                                                                                                            |                     |
| Form of instruction                                        | Course                                                                                                                                                                                                                                  |                     |
| Languages of instruction                                   | German, English                                                                                                                                                                                                                         |                     |
| Duration (semesters)                                       | 1 Semester Semester                                                                                                                                                                                                                     |                     |
| Module frequency                                           | jedes Semester                                                                                                                                                                                                                          |                     |
| Module capacity                                            | unrestricted                                                                                                                                                                                                                            |                     |
| Time of examination                                        |                                                                                                                                                                                                                                         |                     |
| Credit points                                              | 5 CP                                                                                                                                                                                                                                    |                     |
| Share on module final degree                               | Course 1: %.                                                                                                                                                                                                                            |                     |
| Share of module grade on the course of study's final grade | 1                                                                                                                                                                                                                                       |                     |
| Examination                                                | Exam prerequisites                                                                                                                                                                                                                      | Type of examination |
| Course 1                                                   |                                                                                                                                                                                                                                         |                     |
| Final exam of module                                       | je nach Wahl                                                                                                                                                                                                                            | je nach Wahl        |
| Exam repetition information                                |                                                                                                                                                                                                                                         |                     |
| Form of instruction                                        | Course                                                                                                                                                                                                                                  |                     |
| Course name                                                | je nach Wahl                                                                                                                                                                                                                            |                     |
| SWS                                                        |                                                                                                                                                                                                                                         |                     |
| Workload of compulsory attendance                          |                                                                                                                                                                                                                                         |                     |
| Workload of preparation / homework etc                     |                                                                                                                                                                                                                                         |                     |
| Workload of independent learning                           |                                                                                                                                                                                                                                         |                     |
| Workload (examination and preparation)                     |                                                                                                                                                                                                                                         |                     |
| Workload total                                             | 0                                                                                                                                                                                                                                       |                     |
| Workload self-arranged work (module-oriented)              | 150                                                                                                                                                                                                                                     |                     |
| Total module workload                                      | 150                                                                                                                                                                                                                                     |                     |
| Type of examination                                        |                                                                                                                                                                                                                                         |                     |
| Frequency                                                  | Winter semester                                                                                                                                                                                                                         |                     |
| Capacity                                                   | unrestricted                                                                                                                                                                                                                            |                     |

## GEO.07409.01 - Wahlmodul 2

|                                                            |                                                                                                                                                                                                                                           |                     |
|------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| GEO.07409.01                                               | 5 CP                                                                                                                                                                                                                                      |                     |
| Module label                                               | Wahlmodul 2                                                                                                                                                                                                                               |                     |
| Module code                                                | GEO.07409.01                                                                                                                                                                                                                              |                     |
| Semester of first implementation                           |                                                                                                                                                                                                                                           |                     |
| Module used in courses of study / semesters                | <ul style="list-style-type: none"> <li>Angewandte Geowissenschaften (Applied Geosciences) (MA120 LP) (Master) &gt; Geowissenschaften Angew. Geowissensch.MA120, Version of accreditation valid from WS 2021/22 &gt; Wahlmodule</li> </ul> |                     |
| Responsible person for this module                         |                                                                                                                                                                                                                                           |                     |
| Further responsible persons                                | Prüfungsausschussvorsitz                                                                                                                                                                                                                  |                     |
| Prerequisites                                              |                                                                                                                                                                                                                                           |                     |
| Skills to be acquired in this module                       | <ul style="list-style-type: none"> <li>je nach Wahl</li> </ul>                                                                                                                                                                            |                     |
| Module contents                                            | <ul style="list-style-type: none"> <li>je nach Wahl</li> </ul>                                                                                                                                                                            |                     |
| Form of instruction                                        | Course                                                                                                                                                                                                                                    |                     |
| Languages of instruction                                   | German, English                                                                                                                                                                                                                           |                     |
| Duration (semesters)                                       | 1 Semester Semester                                                                                                                                                                                                                       |                     |
| Module frequency                                           | jedes Semester                                                                                                                                                                                                                            |                     |
| Module capacity                                            | unrestricted                                                                                                                                                                                                                              |                     |
| Time of examination                                        |                                                                                                                                                                                                                                           |                     |
| Credit points                                              | 5 CP                                                                                                                                                                                                                                      |                     |
| Share on module final degree                               | Course 1: %.                                                                                                                                                                                                                              |                     |
| Share of module grade on the course of study's final grade | 1                                                                                                                                                                                                                                         |                     |
| Examination                                                | Exam prerequisites                                                                                                                                                                                                                        | Type of examination |
| Course 1                                                   |                                                                                                                                                                                                                                           |                     |
| Final exam of module                                       | je nach Wahl                                                                                                                                                                                                                              | je nach Wahl        |
| Exam repetition information                                |                                                                                                                                                                                                                                           |                     |
| Form of instruction                                        | Course                                                                                                                                                                                                                                    |                     |
| Course name                                                | je nach Wahl                                                                                                                                                                                                                              |                     |
| SWS                                                        |                                                                                                                                                                                                                                           |                     |
| Workload of compulsory attendance                          |                                                                                                                                                                                                                                           |                     |
| Workload of preparation / homework etc                     |                                                                                                                                                                                                                                           |                     |
| Workload of independent learning                           |                                                                                                                                                                                                                                           |                     |
| Workload (examination and preparation)                     |                                                                                                                                                                                                                                           |                     |
| Workload total                                             | 0                                                                                                                                                                                                                                         |                     |
| Workload self-arranged work (module-oriented)              | 150                                                                                                                                                                                                                                       |                     |
| Total module workload                                      | 150                                                                                                                                                                                                                                       |                     |
| Type of examination                                        |                                                                                                                                                                                                                                           |                     |
| Frequency                                                  | Winter semester                                                                                                                                                                                                                           |                     |
| Capacity                                                   | unrestricted                                                                                                                                                                                                                              |                     |

