Modules for Werkstofftechnik

Pflichtmodule

CHE.03150.02 - Master Thesis (M.Sc.)

Madula labal		Mastar Thasis (M.S.)
Module label		Master Thesis (M.Sc.)
Module code		CHE.03150.02
Semester of first implementation Module used in courses of study / semeste	rs	 Applied Polymer Science (MA120 LP) (Master) > Werkstofftechnik App. Polymer ScienceMA120, Version of accreditation valid from WS 2007/08 > Pflichtmodule
Responsible person for this module		
Further responsible persons		professors or lecturers of the university
Prerequisites		all modules of APS
Skills to be acquired in this module		
		 carrying out of independent research literature studies and experimental work writing of the thesis defense of the thesis
Module contents		 thesis related to polymer chemistry, physics, engineering, or biopolymers carrying out literature research collecting experimental data and doing of data evaluation oral presentation of the final thesis including defense
Form of instruction		Independent supervised work (30 SWS)
Languages of instruction		German, English
Duration (semesters)		1 Semester Semester
Module frequency		jedes Semester
Module capacity		unlimited
Time of examination		
Credit points		30 CP
Share on module final degree		Course 1: %.
Share of module grade on the course of stu	udy's final grade	1
Examination	Exam prerequisites	Type of examination
Course 1		
Final exam of module		written Master Thesis, oral defence
Exam repetition information		
Form of instruction	Independent supervised work	
Course name	Master Thesis	
SWS	30	
Norkload 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	900	

Date 17/04/25



Total module workload	900
Type of examination	
Frequency	Summer or winter semester
Capacity	unlimited

PHY.03142.02 - Polymer Physics

Module label	Polymer Physics
Module code	PHY.03142.02
Semester of first implementation	
Module used in courses of study / semesters	 Applied Polymer Science (MA120 LP) (Master) > Werkstofftechnik App. Polymer ScienceMA120, Version of accreditation valid from WS 2007/08 > Pflichtmodule Polymer Materials Science (MA120 LP) (Master) > Werkstofftechnik PolymerMaterialScMA120, Version of accreditation (WS 2009/10 - SS 2014) > Pflichtmodule
Responsible person for this module	
Further responsible persons	Prof. Dr. Thomas Thurn-Albrecht
Prerequisites	
Skills to be acquired in this module	
	 acquintance with the fundamental concepts of experimental polymer physics learning and applying the theoretical fundamentals and the experimental physical methods used to characterize and investigate polymer materials gaining practical experience with basic methods in experimental polymer physics understanding the properties of polymer surfaces knowledge of methods and technologies to modify and analyse polymer surfaces
Module contents	Lectures: 1. Introduction to Polymer Physics
	 chain molecules in solutions and melts (description of chain molecules, chain models, excluded volume interaction, semidilute solutions, screening, structure factor) mechanical properties of polymer melts (viscoelasticity, Debyerelaxation, relaxation processes in polymer melts, flow behavior, dynamic and thermic glass transition, nonlinear effects) microscopic models for polymer dynamics (diffusion, Rouse model, reptation) solid polymers (rubber elasticity, semicrystalline polymers and crystallization) blends and block copolymers (Flory-Huggins theory, spinodal decomposition, block copolymers and self assembly) outlook: polymers in nature
	2. Experimental Methods of Polymer Physics
	 scattering techniques (X-ray, light and neutron scattering) relaxation spectroscopy (dynamic mechanical and dielectric spectroscopy) calorimetry (DSC, TMDSC) spectroscopy (IR, Raman, NMR) microscopy (light-, electron- and scanning force microscopy) 3. Surface Science
	 surface vs. Bulk surface composition and ordering dynamic surface processes (adsorption, desorption, diffusion) surface tension surface analysis (XPS, SIMS, SEM, AFM) surface modification by deposition (wet processes, dry processes, CVD, PE-CVD, PVD), polymer film growth surface modification by ablation (wet and dry etching) surface funtionalization (Grafting, plasma treatments) polymer in lithography technical applications for surface modification



PHY.03142.02									15 CP
					Exper	Course: mental Polymer P eriments, each co		ntact hours)	
					• • •	rheology/mechan dielectric spectros DSC polarization micro infrared spectroso low-field NMR wide-angle X-ray	scopy oscopy/strain bire copy		
Forms of instru	iction				Lectu Lectu Lectu	cal training (4 SW re (3 SWS) re (2 SWS) re (2 SWS) nar (2 SWS) se	S)		
Languages of in	nstruction				Germ	an, English			
Duration (seme	sters)				1 Sem	ester Semester			
Module frequer	су				jedes S	Sommersemester			
Module capacit	у				unlimit	ed			
Time of examin	ation								
Credit points					15 CP				
Share on modu	le final degree				Cours 6: %.	se 1: %; Course 2:	%; Course 3: %;	Course 4: %; Cou	rse 5: %; Course
Share of modul	e grade on the c	ourse of study's f	inal grade		1				
Examination			Exam prerequ	uisite	S		Type of examin	nation	
Course 1									
Course 2									
Course 3									
Course 4									
Course 5									
Course 6									
Final exam of	module				course protocols ons; 3 final writte	s; seminar en examinations	oral examinatio	n	
Exam repetition	on 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	Lab Course Experimental Polymer Physics		4					0
Course 2	Lecture	Lecture Introduction to Polymer Physics		3					0
Course 3	Lecture	Lecture Experimental Methods of Polymer Physics		2					0
Course 4	Lecture	Lecture Surface Science		2					0
Course 5	Seminar	Seminars on Introduction to Polymer Physics and Experimental		2					0

4 / 10



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
		Methods of Polymer Physics						
Course 6	Course	Private Study						0
Workload by	module					45	0	450
Total module	workload							450

ZIW.03143.01 - Polymer Processing

Module contents Lecture: Polymer Processing • fundamentals of polymer processing • extrusion • injection molding • rubber processing • blow molding • rapid prototyping technologies • composite manufacturing Lab Course: Polymer Processing Lab extrusion: operating diagram / residence time determination / melt mixing cast film extrusion: incompatibility and interface disturbance blown film extrusion: influence of blow-up ratio, take-off ratio and cooling rate on mechanical properties injection molding	ZIW.03143.01	5 CP
Senset of first implementation Module used in courses of study / sensets Appled Polymer Science (MA120 LP) (Matter) > Workstofflechnik, App. Polymer Science (MA120 LP) (Matter) > Workstofflechnik, App. Polymer Science (MA120 LP) (Matter) > Workstofflechnik, Polymer Processing Parter (Matter) = Polymer Processing Parte	Module label	Polymer Processing
Module used in courses of study / semesters - Applied Polymer Science MA(12) LP) (Master) > Workstofflechnik App. Polymer Science MA(12) LP) (Master) > Workstofflechnik App. Polymer Science MA(12) LP) (Master) > Workstofflechnik Polymer Materiels Science (MA12) LP) (Master) > Workstofflechnik Polymer Polymer Materiels Science (MA12) LP) (Master) > Workstofflechnik Polymer Polymer Materiels Science (MA12) LP) (Master) > Workstofflechnik Polymer Polymer Materiels Science (MA12) LP) (Master) > Workstofflechnik Polymer Polymer Polymer Polymer Materiels Science (MA12) LP) (Master) > Workstofflechnik Polymer Poly	Module code	ZIW.03143.01
App. Polymer Materials Science (A120, Version of acceditation valid from WS 200760 > Plickmodule Polymer Materials Science (A120, Version of acceditation (VS 200810 - SS 2014) > Plickmodule Responsible person for this module Further responsible persons Production of this module Skills to be acquired in this module Skills to be acquired in this module Skills to be acquired in this module Module contents Version of accessing Interview Polymer Processing • Entry • Underwerse Nodule contents Version of accessing • Entry • Entry • Entry • Entry • Contents Version of accessing • Entry	Semester of first implementation	
Further responsible persons Prof. Dr. Hans-Joachim Radusch Prerequisites Important methods and technological equipment for the production of both semi-indical products based on polymer processing understanding the working principies of polymer processing techniques Module contents Lacture: Polymer Processing Module contents Lacture: Polymer Processing Set in the module indication of the semi-analytic of provide processing techniques - fundamentals of polymer processing - outrainion - injection moding - unber processing Set in the module indication of the semi-analytic of the semi-analyti	Module used in courses of study / semesters	 App. Polymer ScienceMA120, Version of accreditation valid from WS 2007/08 > Pflichtmodule Polymer Materials Science (MA120 LP) (Master) > Werkstofftechnik PolymerMaterialScMA120, Version of accreditation (WS 2009/10 - SS
Precequisites Skills to be acquired in this module Iearning the most important methods and technological equipment for the production of both semi- and final produces in problems or polymer processing machines performing lab experiments to get acquisited with modern polymer processing technological Module contents Lacture: Polymer Processing - fundamentals of polymer processing - fundamentals of polymer processing - fundamentals of polymer processing - fundamentals of polymer processing - fundamentals of polymer processing - fundamentals of polymer processing - fundamentals of polymer processing - fundamentals of polymer processing - fundamentals of polymer processing - fundamentals of polymer processing - fundamentals of polymer processing - fundamentals of polymer processing - fundamentals of polymer processing - fundamentals of polymer processing - fundamentals of polymer processing - fundamentals of polymer processing - fundamentals of polymer processing - fundamentals of polymer processing - fundamentals of polymer processing - fundamentals of polymer processing - fundamentals of polymer processing - fundamentals - fundamentals of polymer processing - fundamentals - foreprocessing - fundamentals - fundamen	Responsible person for this module	
Skills to be acquired in this module learning the most important methods and technological equipment for the production of both semi- and final processing machines a performing lab experiments to get acquained with modern polymer processing techniques Module contents Lecture: Polymer Processing Module contents - fundamentals of polymer processing extrasion - injection moding - injection moding - injection moding - injection moding - injection moding - extrusion - extrusion - extrusion - injection moding - extrusion: incompatibility and interface disturbance - compositing dagram / residence time determination / melt mixing - extrusion: incompatibility and interface disturbance - forms of instruction - get processing currently / ubber mixing (kneader) / compression moding - features - get processing currently / ubber mixing (kneader) / compression moding - features - get processing currently / ubber mixing (kneader) / compression moding - features - get processing currently / ubber mixing (kneader) / compression moding - features <td< th=""><th>Further responsible persons</th><th>Prof. Dr. Hans-Joachim Radusch</th></td<>	Further responsible persons	Prof. Dr. Hans-Joachim Radusch
Production of both semi- and final processing machines understanding the working principles of polymer processing interfailing techniques Module contents Lecture: Polymer Processing Image: set techniques - fundamentats of polymar processing activation modifing - injection modifing - processing currently / tubber mission influence of blow-up raite, take-off ratio and cooling rate or mechanical properties 	Prerequisites	
Folymer Processing • fundamentals of polymer processing • extrusion • rubber processing • rubber processing • rubber processing • rubber processing • rapid processing • rapid processing • rapid processing • rapid processing Lab • rapid processing lab extrusion: compatibility and interface disturbance blown film extrusion: influence of blow-up ratio, take-off ratio and cooling rate on mechanical properties Injection molding: parameter influence / filing behavior / multi component injecton molding rubber processing: curemetry / rubber mixing (kneader) / compression molding rubber processing: curemetry / rubber mixing (kneader) / compression molding rubber processing: curemetry / rubber mixing (kneader) / compression molding rubber processing: curemetry / rubber mixing (kneader) / compression molding rubber for coastruction Paratical training (2 SWS) Lesture (2 SWS) Languages of instruction German, English Duration (semesters) 1 Semester Semester Module capacity unlimited Time of examination Course 1 Credit points 5 CP Share on module grade on the course of study's final grade 1 Examination Exam prerequisites Type of	Skills to be acquired in this module	production of both semi- and final products based on polymer materials understanding the working principles of polymer processing machines performing lab experiments to get acquainted with modern polymer processing
extrusion • extrusion injection molding • tubber processing • composite manufacturing • composite manufacturing extrusion: information / melt mixing cast film extrusion / coextrusion: information / melt mixing information / compression molding / restruction Earguages of instruction German, English Duration (semesters) 1 Semester Semester Module frequency jedes Wintersemester Module frequency 5 CP Share on module final degree Course 1: %; Course 2: %; Course 3: %.	Module contents	
Polymer Processing Lab extrusion: incompatibility and interface disturbance blown film extrusion: incompatibility and interface disturbance blown film extrusion: influence of blow-up ratio, take-off ratio and cooling rate on mchanical properties injection molding: parameter influence / filling behavior / multi component injection molding: parameter influence / filling behavior / multi component injection molding: parameter influence / filling behavior / multi component injection molding: parameter influence / filling behavior / multi component injection molding: parameter influence / filling behavior / multi component injection molding: parameter influence / filling behavior / multi component injection molding: parameter influence / filling behavior / multi component injection molding: parameter influence / filling behavior / multi component injection molding: parameter influence / filling behavior / multi component injection molding: parameter influence / filling behavior / multi component injection molding: parameter influence / filling behavior / multi component injection molding: parameter influence / filling behavior / multi component injection molding: parameter influence / filling behavior / multi component injection molding: parameter influence / genessing: curemetry / rubber mixing (kneader) / compression molding / testing Languages of instruction German, English Duration (semesters) 1 Semester Semester Module frequency jedes Wintersemester Module capacity unlimited Time of examination Course 1: %; Course 2: %; Course 3: %. Share of module grade on the course of study's final grade 1 Exam prerequisites Type of examination <th></th> <th> extrusion injection molding rubber processing blow molding rapid prototyping technologies </th>		 extrusion injection molding rubber processing blow molding rapid prototyping technologies
Languages of instruction German, English Duration (semesters) 1 Semester Semester Module frequency jedes Wintersemester Module capacity unlimited Time of examination 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 Type of examination Course 1 Type of examination Course 2 Type of examination Course 3 Type of examination Examination Exam prerequisites Type of examination Course 2 Course 3 Type of examination Course 3 Exam prerequisites Type of examination		Polymer Processing Lab extrusion: operating diagram / residence time determination / melt mixing cast film extrusion / coextrusion: incompatibility and interface disturbance blown film extrusion: influence of blow-up ratio, take-off ratio and cooling rate on mechanical properties injection molding: parameter influence / filling behavior / multi component injection molding rubber processing: curemetry / rubber mixing (kneader) / compression molding
Duration (semesters) 1 Semester Semester Module frequency jedes Wintersemester Module capacity unlimited Time of examination 5 CP 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 1 Course 1 Exam prerequisites Type of examination Course 1 Course 2 Course 3 Tupe of examination Final exam of module attestations to the individual experiments written examination	Forms of instruction	Lecture (2 SWS)
Module frequency jedes Wintersemester Module capacity unlimited Time of examination 5 CP 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 Type of examination Course 2 Course 2 Course 3 Type of examination Course 3 attestations to the individual experiments written examination	Languages of instruction	German, English
Module capacity unlimited Time of examination Credit points 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 2 Course 2 Final exam of module attestations to the individual experiments written examination	Duration (semesters)	1 Semester Semester
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 2 Course 2 Course 3 Final exam of module Attestations to the individual experiments written examination	Module frequency	jedes Wintersemester
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 1 Course 2 Course 2 Course 3 Final exam of module Attestations to the individual experiments written examination	Module capacity	unlimited
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 Course 3 Exam of module experiments written examination	Time of examination	
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 attestations to the individual experiments written examination	Credit points	5 CP
Examination Exam prerequisites Type of examination Course 1		
Course 1 Course 2 Course 3 Final exam of module attestations to the individual experiments written examination		-
Course 2 Course 3 Final exam of module attestations to the individual experiments		Exam prerequisites Type of examination
Course 3 attestations to the individual experiments written examination		
Final exam of module attestations to the individual experiments written examination	Course 2	
· · · · · · · · · · · · · · · · · · ·	Course 3	
Exam repetition information	Final exam of module	attestations to the individual experiments written 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	Practical training	Lab Course Polymer Processing		2				0
Course 2	Lecture	Lecture Polymer Processing		2				0
Course 3	Course	Private Study						0
Workload by m	odule					150)	150
Total module v	vorkload							150



Vertiefung

ZIW.03148.02 - Advanced Polymer Engineering

ZIW.03148.02	10 CF
Module label	Advanced Polymer Engineering
Module code	ZIW.03148.02
Semester of first implementation	
Module used in courses of study / semesters	 Applied Polymer Science (MA120 LP) (Master) > Werkstofftechnik App. Polymer ScienceMA120, Version of accreditation valid from WS 2007/08 > Vertiefung Polymer Materials Science (MA120 LP) (Master) > Werkstofftechnik PolymerMaterialScMA120, Version of accreditation (WS 2009/10 - SS 2014) > Vertiefung
Responsible person for this module	
Further responsible persons	Dr. Rene Androsch
Prerequisites	
Skills to be acquired in this module	
	 acquiring perspectives for the work as a polymer engineer gain familiarity with the most important concepts and experimental techniques for mechanical testing of polymers acquiring a basic knowledge about inorganic materials used to process or to be combined with polymers
Module contents	Lectures: 1. Testing of Polymers
	 elastic, viscoelastic and plastic deformation behaviour of polymers and phenomenological models quasistatic test methods of polymers (tensile, compression, bending) hardness measurement and test methods charpy impact test and instrumented impact test methods for thoughness characterization
	2. Polymeric Materials
	 chemical and physical structure mechanical, thermal, optical, and electrical properties structure-property relations polymeric materials: structure, properties, applications
	a. thermoplastics (commodity polymers, polyesters, polyamides, high- performance polymers) b. elastomers c. thermosets Lab Course: Polymer Testing Lab
	 characterization of elastic properties tensile test on plastics bend test compression test charpy impact test hardness measurement drop weight test tensile impact test
Forms of instruction	Lecture (2 SWS) Lecture (2 SWS) Practical training (2 SWS) Seminar (1 SWS) Course Study trip



Languages of i	nstruction			Gerr	man, English			
Duration (seme	esters)			1 Sen	nester Semester			
Module freque	ncy			jedes	Wintersemester			
Module capacit	ty			unlimi	ited			
Time of examin	nation							
Credit points				10 CF	D			
Share on modu	Ile final degree			Cour 6: %.	rse 1: %; Course 2:	%; Course 3: %;	Course 4: %; Cou	rse 5: %; Course
Share of modu	le grade on the	course of study's f	inal grade	1				
Examination			Exam prerequis	ites		Type of examin	nation	
Course 1								
Course 2								
Course 3								
Course 4								
Course 5								
Course 6								
Final exam of	module		completion of la problem set sole	b course protoco utions	ls; seminar	oral or written e	examination	
Exam repetition	on 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	Lecture Testing of Polymers	2					
Course 2	Lecture	Lecture Polymeric Materials	2					
Course 3	Practical training	Lab Course Polymer Testing	2					
Course 4	Seminar	Seminar Polymeric Materials	1					
	Course	Private Study						
Course 5			2					
	Study trip	Excursion Polymer Industry						
Course 5 Course 6 Workload by m		Polymer				300)	

