

003366The following study plan is tentative: changes can happen each semester (last update: 2019.02.12)

Semester 1: Adaptation Phase

Modules		UdS			
	Course	Responsible	Code	ECTS	
I. Structure & Properties	Microstructure Development	Busch		3	
	Continuum Mechanics	Diebels	KonM	4	
	Thermodynamics of Heterogeneous Materials	Possart	ThS	5	
	Intermetallic Compounds	Busch	IPhas	3	
	Theoretical Material Physics	Müser	TMP	5	
	Computer Simulation in Material Physics	Müser	?	8	
	Experimental Mechanics	Diebels	ExMech	4	
II. Materials Characterization	3D Analysis of Micro and Nanostructures - Basics	Mücklich	3DMN1	3	
	Methodology 2: Basics of Microscopy and Spectroscopy	Motz	TeG	5	
	Methodology 4: High Resolution Microscopy II (TEM, SPM)	Motz	HMV2	3	
	Diffraction Methods	Mücklich	BEUG	5	
III. Materials Engineering & Processing Technologies	Machining Technologies	Bähre	Spanf	3	
	Surface Engineering	Busch	Otech	3	
	Nonferrous Metals I	Busch	NEM1	3	

Modules		UPC			
	Course	Responsible	Code	ECTS	
I. Structure & Properties	Physical Metallurgy	Prado		5	
	Physical Properties of Materials	Jiménez		5	
	Mechanical Behaviour of Materials	Alcala		5	
II. Materials Characterization	Microstructural Materials Characterisation	Manero		5	
III. Materials Engineering & Processing Technologies	Micro-Mechanical Design of Materials, Nanomechanics and Coatings	Llanes		5	

Modules		LTU			
	Course	Responsible	Code	ECTS	
I. Structure & Properties	Deformation and Fracture	Akthar	T7001T	7,5	
	Material Science & Engineering I	Wallström	T0004T	7,5	
II. Materials Characterization	<i>Advanced Materials Characterisation Techniques (Course given during the second semester at LTU)</i>	<i>Akthar</i>	<i>T7003T</i>	<i>7,5</i>	
III. Materials Engineering & Processing Technologies	Materials Technology and Materials Selection	Wallström	T0003T	7,5	

Comment: courses in italic might be chosen depending on the student backgrounds.

Modules		UL			
	Course	Responsible	Code	ECTS	
I. Structure and Properties	Crystal Structures and Defects	Redjaimia		5	
	Physical Properties of Materials	Bauer		5	
	Materials Mechanics I: Viscoelasticity	Ayadi		4	
	Macromolecular Chemistry	Six		4	
II. Materials Characterization	Materials Characterisation	Bauer		5	
III. Materials Engineering & Processing Technologies	Chemical Reaction Engineering	SIMONNOT		3	

Description:

Module I: Microstructure, nanostructure, materials physics, crystal structures, structural, mechanical and functional, properties

Module II: Diffraction, microscopy, spectroscopy, materials testing, micro/nano/atomic scale

Module III: Materials selection, deposition techniques, materials for special applications, chemical eng., processing technologies

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Track 1: Advanced Metallic Materials - Design, characterization and processing

UdS				
	Course	Responsible	Code	ECTS
Semester 2	Steel II	Busch	Stahl	3
	Powder Metallurgy	Busch	PuMet	3
	Amorphous Metals	Busch	AmoMet	3
	Machining Technologies	Bähre	Spanf	3
	Precision Machining Technologies	Bähre	FBTec	3
	3D Analysis of Micro and Nanostructures - Advanced Methods	Mücklich	3DMN2	3
	Methodology 7: Nano- and micromechanical testing methods	Motz	NMMMM	3
	Material Modelling	Diebels	MaMo	4
	Methodology 3: High Resolution Microscopy I (SEM, EDS)	Motz	HMV1	4
	Laser Treatment of Materials - Applications	Mücklich	Las2	4
	Physical Acoustics 1	Rabe		4
	Computer Simulation in Materials Physics	Müser		4
	Functional Materials II	Mücklich	FuWV	4
	Internship (Industry)	Motz, Marx	FPI	6
	Seminar Material Engineering	All Professors	SMWS	2 - 4
Semester 3	Nonferrous Metals I	Busch	NEM1	3
	Nonferrous Metals II	Busch	NEM2	3
	Intermetallic Compounds	Busch	IPhas	3
	Lightweight Systems 1	Herrmann		3
	Surface Engineering	Busch	OTech	3
	Heavy Plate Production and Processing	Kalla		3
	Non-Destructive Testing of Materials II	Boller	ZfP2	3
	Methodology 4: High Resolution Microscopy II (TEM, SPM)	Motz	HMV2	3
	3D Analysis of Micro and Nanostructures - Basics	Mücklich	3DMN1	3
	Structural Durability	Boller		3
	Corrosion and High Temperature Behavior	Busch	KorHT	3
	Microstructure Development	Busch		3
	Laboratory Materials Science	Motz, Marx	PrMW	4
	Fracture Mechanics	Motz	Bruch	4
	Physical Acoustics 2	Rabe		4
	Diffraction Methods	Mücklich	BEUG	5
	Methodology 2: Basics of Microscopy and Spectroscopy	Motz	TeG	5
	Theoretical Material Physics	Müser	TMP	5
Computer Simulation in Material Physics	Müser		8	
Internship (Industry)	Motz, Marx	FPI	6	
Seminar Material Science	All Professors	SMWW	2 - 4	
UPC				
	Course	Responsible	Code	ECTS
Semester 2	Metals and Alloys	Calvo		5
	Corrosion and Degradation of Materials	Iribarren & Fernandez		5
	Fracture and Fatigue	Anglada		5
	New perspectives in Materials Science	Llanes		5
	Development of Competences for the Search and Publication of Information in Materials Science	Library staff		2
	Materials Selection in Mechanical Design	Cabrera		5
	Internship (Industry)	All Professors		5
	Metals Technology	Prado		5
Semester 3	Light Alloys	Calvo		5
	Failure Analysis and Quality Control in Materials Technology	Mateo		5
	Materials Joining Technologies	Mateo		5
	Surface Technology			5
	Nanotechnology	Cabreera		5
	Modelling of Plastic Deformation of Metals	Riera		5
	Internship (Industry)	All Professors		5
Tutorised Research Work	All Professors		5	

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LTU				
	Course	Responsible	Code	ECTS
Semester 2	Phase Transformations (semester 1)	Akthar	T7008T	7,5
	Advanced Materials Characterization Techniques	Akthar	T7003T	7,5
	Select 2 of the following (italic):			
	<i>Materials Modelling</i>	Joffe	T7002T	7,5
	<i>Surface Engineering</i>	Vuorinen	T7004T	7,5
	<i>Nanomaterials</i>	Soldatov	T7006T	7,5
	<i>Materials Selection and Ecodesign</i>	Vuorinen	T0007T	7,5
Semester 3	Advanced Metallic Materials - Project Work	All Professors	T0009T	27
UL				
	Course	Responsible	Code	ECTS
Semester 2	Inorganic Materials Phase Transformation	Redjaimia		5
	Solid State Diffusion	Redjaimia		4
	Materials Mechanics II: Plasticity	Ayadi		4
	Materials Degradation	Jonquières/Mat hieu		3
	Bibliographic Project	Horwat		3
	Materials Characterization	Redjaimia		1,5
	Granular Solids and Porous Media	Barth		3
	Measurements and Data Interpretation	Besson		2
	Materials Selection	Redjaimia		1
Semester 3	Plastic Deformation and Microstructures	Jacques		3
	Microstructure Formation	Gautier/Bauer Grosse		3
	Elaboration Processes	Patisson		3
	Characterisation Methods	Dehmas		3
	Stress Microstructure Relationship	Denis		3
	Advanced Metallic Materials - Project Work	Horwat		15

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Track 2: Polymers and Composites - Modelling, processing & tailored properties

UdS				
	Course	Responsible	Code	ECTS
Semester 2	Experimental Characterization of Polymer Materials	Possart	ECPol	3
	Adhesives and Adhesive Bonding Technology	Possart	Kleb	3
	Organic Layers - Preparation and Characterization	Possart	OSHC	3
	High-Performance Ceramics	Falk	HLKer	3
	Lightweight Systems 2	Herrmann		3
	3D Analysis of Micro and Nanostructures - Advanced Methods	Mücklich	3DMN2	3
	Numerical Mechanics	Diebels	NuMech	4
	Physical Acoustics 1	Rabe		4
	Material Modelling	Diebels	MaMo	4
	Empirical and Statistical Modelling	Bähre	EsMod	4
	Finite Elements in Continuum Mechanics	Diebels	FEMM	4
	Internship (Industry)	Motz, Marx	FPI	6
	Seminar Material Engineering	All Professors	SMWS	2 - 4
Semester 3	Synthesis of Polymers	Wenz	MC01	2
	Non-Destructive Testing of Materials II	Boller	ZfP2	3
	Functional Coatings	Kraus	GuKBe	3
	Methodology 4: High Resolution Microscopy II (TEM, SPM)	Motz	HMV2	3
	Lightweight Systems 1	Herrmann		3
	Polymer - Solid Interphases	Possart	PFInt	3
	3D Analysis of Micro and Nanostructures - Basics	Mücklich	3DMN1	3
	NanoBioMaterials 1	Arzt	NBM-1	3
	Corrosion and High Temperature Behavior	Busch	KorHT	3
	Experimental Mechanics	Diebels	ExMech	4
	Continuum Mechanics	Diebels	KonM	4
	Physical Acoustics 2	Rabe		4
	Thermodynamics of Heterogeneous Materials	Possart	ThS	5
	Theoretical Material Physics	Müser	TMP	5
	Computer Simulation in Material Physics	Müser		8
	Laboratory Materials Science	Motz, Marx	PrMW	4
Internship (Industry)	Motz, Marx	FPI	6	
Seminar Material Science	All Professors	SMWW	2 - 4	
UPC				
	Course	Responsible	Code	ECTS
Semester 2	Natural Materials and Biomaterials	Ginebra		5
	New perspectives in Materials Science	Llanes		5
	Plastics Materials: Characterization and Applications	Santana		5
	Technological Biopolymers	Munoz		5
	Technology of Plastic	Martinez		5
	Internship (Industry)	All Professors		5
	Development of Competences for the Search and Publication of Information in Materials Science	Library staff		2
Semester 3	Advanced Ceramics and Inorganic Composite Materials	Anglada		5
	Composite Materials	Pagés		5
	Design, Ecodesign and Polymers Recycling	Maspoch		5
	Life Tissues, Substitutive Materials and Biointerfaces	Engel		5
	Polymers and Composites	Martinez		5
	Internship (Industry)	All Professors		5
Tutorised Research Work	All Professors		5	
LTU				
	Course	Responsible	Code	ECTS
Semester 2	Composites	Varna	T7012T	7,5
	Aerospace Materials	Varna	T7005T	7,5
	Advanced Materials Characterization Techniques	Akthar	T7003T	7,5
	Select 1 of the following (italic):			
	<i>Phase Transformations (semester 1)</i>	Akthar	T7008T	7,5
<i>Laser Material Processing (semester 1)</i>	Kaplan	T0018T	7,5	
<i>Materials Mechanics (semester 1)</i>	Lindgren	T7016T	7,5	
Semester 3	Polymers and composites - Project Work	All Professors	T7009T	27

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UL				
	Course	Responsible	Code	ECTS
Semester 2	Polymer Physics	Etienne		5
	Composite Materials with Polymeric Matrix	Etienne		1,5
	Mechanical Behaviour of Composite Materials	Meshaka		3
	Process Engineering	Simmonot		3
	Laboratory: Polymers	Etienne		2
	Separation Engineering	Barth		2
	Materials Mechanics II: Plasticity	Ayadi		4
	Bibliographic Project	Horwat		3
	Formulation of Polymer Blends	Six		0,5
	Medical Applications of Polymers	Six		0,5
	Functional Polymers	Etienne		1
	Biopolymers and Degradable Polymers	Jonquieres		0,5
	Semester 3	Not Available		

Comment: only one internship can be done during semester 2 or semester 3.

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Track 3: High Performing Surfaces - Coating, structuring & functionalization

UdS				
	Course	Responsible	Code	ECTS
Semester 2	Nonferrous Metals II	Busch	NEM2	3
	High-Performance Ceramics	Falk	HLKer	3
	Precision Machining Technologies	Bähre	FBTec	3
	Organic Layers - Preparation and Characterization	Possart	OSHC	3
	Adhesives and Adhesive Bonding Technology	Possart	Kleb	3
	NanoBioMaterials 2	Arzt	NBM-2	3
	Finite Elements in Continuum Mechanics	Diebels	FEMM	4
	Functional Materials II	Mücklich	FuWV	4
	Computer Simulation in Materials Physics	Müser		4
	Numerical Mechanics	Diebels	NuMech	4
	Laser Treatment of Materials - Applications	Mücklich	Las2	4
	Methodology 3: High Resolution Microscopy I (SEM, EDS)	Motz	HMV1	4
	Material Modelling	Diebels	MaMo	4
	Internship (Industry)	Motz, Marx	FPI	6
	Seminar Material	All Professors	SMWS	2 - 4
Semester 3	Non-Destructive Testing of Materials II	Boller	ZfP2	3
	Intermetallic Compounds	Busch	IPhas	3
	Surface Engineering	Busch	OTech	3
	Microstructure Development	Busch		3
	Laser Treatment of Materials - Interaction with Matter	Mücklich	Las1	3
	3D Analysis of Micro and Nanostructures - Basics	Mücklich	3DMN1	3
	Functional Coatings	Kraus	GuKBe	3
	Polymer - Solid Interphases	Possart	PFInt	3
	NanoBioMaterials 1	Arzt	NBM-1	3
	Methodology 4: High Resolution Microscopy II (TEM, SPM)	Motz	HMV2	3
	Theoretical Material Physics	Müser	TMP	5
	Computer Simulation in Material Physics	Müser		8
	Laboratory Materials Science	Motz, Marx	PrMW	4
	Internship (Industry)	Motz, Marx	FPI	6
Seminar Material Science Seminar	All Professors	SMWW	2 - 4	
UPC				
Semester 2	Course	Responsible	Code	ECTS
	Not Available			
Semester 3	Not Available			
LTU				
Semester 2	Course	Responsible	Code	ECTS
	Surface Engineering	Vuorinen	T7004T	7,5
	Advanced Materials Characterization Techniques	Akthar	T7003T	7,5
	Select 1 of the following (italic):			
	<i>Phase Transformations (semester 1)</i>	Akthar	T7008T	7,5
	<i>Materials Mechanics (semester 1)</i>	Lindgren	T7016T	7,5
	Select 1 of the following (italic):			
	<i>Nanomaterials</i>	Soldatov	T7006T	7,5
<i>Materials Modeling</i>	Joffe	T7002T	7,5	
<i>Material Selection and Ecodesign</i>	Vuorinen	T0007T	7,5	
Semester 3	High performing Surfaces - Project Work	All Professors	T7009T	27
UL				
Semester 2	Course	Responsible	Code	ECTS
	Not Available			
Semester 3	Plastic Deformation and Microstructures	Jacques		3
	Microstructure Formation	Gautier/Bauer- Grosse		3
	Elaboration Processes	Patisson		3
	Surface Treatment I: Introduction	Capon		3
	Surface Treatment II	Horwat		3
	High Performing Surfaces - Project Work	Horwat		15

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Track 4: Materials Engineering and Manufacturing Technologies

UdS				
	Course	Responsible	Code	ECTS
Semester 2	Powder Metallurgy	Busch	PuMet	3
	Lightweight Systems 2	Herrmann		3
	Production Engineering	Bähre	ProdSys	3
	Amorphous Metals	Busch	AmoMet	3
	Precision Machining Technologies	Bähre	FBTec	3
	Structural Health Monitoring	Boller		3
	Nonferrous Metals II	Busch	NEM2	3
	Steel II	Busch	Stahl	3
	3D Analysis of Micro and Nanostructures - Basics	Mücklich	3DMN1	3
	Computer Simulation in Materials Physics	Müser		4
	Physical Acoustics 1	Rabe		4
	Methodology 3: High Resolution Microscopy I (SEM, EDS)	Motz	HMV1	4
	Machine Dynamics	Diebels		4
	Fluid Mechanics	Roland	Ström	4
	Laser Treatment of Materials - Applications	Mücklich	Las2	4
	Finite Elements in Continuum Mechanics	Diebels	FEMM	4
	Internship (Industry)	Motz, Marx	FPI	6
Seminar Material Engineering	All Professors	SMWS	2 - 4	
Semester 3	Functional Coatings	Kraus	GuKBe	3
	Joining Technology	Kalla		3
	Non-Destructive Testing of Materials II	Boller	ZfP2	3
	Surface Engineering	Busch	OTech	3
	Machining Technologies	Bähre	Spanf	3
	Shaping Processes	Bähre	URUmV	3
	Heavy Plate Production and Processing	Kalla		3
	Lightweight Systems 1	Herrmann		3
	Laser Treatment of Materials - Interaction with Matter	Mücklich	Las1	3
	Structural Durability	Boller		3
	Corrosion and High Temperature Behavior	Busch	KorHT	3
	Theoretical Material Physics	Müser	TMP	5
	Computer Simulation in Material Physics	Müser		8
	Laboratory Materials Science	Motz, Marx	PrMW	4
	Internship (Industry)	Motz, Marx	FPI	6
Seminar Material Science	All Professors	SMWW	2 - 4	
UPC				
Semester 2	Course	Responsible	Code	ECTS
	Not Available			
Semester 3	Not Available			
LTU				
Semester 2	Course	Responsible	Code	ECTS
	Laser Material Processing (semester 1)	Kaplan	T0018T	7,5
	Advanced Materials Characterization Techniques	Antti	T7003T	7,5
	Advanced Processing and Cyberlab	Kaplan	T7015T	7,5
	Select 1 of the following (italic):			
	<i>Surface Engineering</i>	Vuorinen	T7004T	7,5
	<i>Nanomaterials</i>	Soldatov	T7006T	7,5
<i>Materials Modeling</i>	Joffe	T7002T	7,5	
<i>Biocomposites</i>	Aitomäki	T7017T	7,5	
Semester 3	Materials Engineering and Manufacturing Technologies - Project Work	All Professors	T7009T	27

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UL				
	Course	Responsible	Code	ECTS
Semester 2	Inorganic Materials Phase Transformation	Redjaimia		5
	Surface Treatment II	Horwat		3
	Ecodesign	Simmonot		2
	Materials Mechanics II: Plasticity	Ayadi		4
	Process Engineering	Simmonot		3
	Separation Engineering	Barth		2
	Materials Mechanics III: Processing and Forming	Ayadi		2
	Granular Solids and Porous Media	Barth		3
	Waste and Effluent Recycling	Pineau/Simmonot		2
Semester 3	Not Available			

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Track 5: Bio/Nanomaterials (including special applications)

UdS				
	Course	Responsible	Code	ECTS
Semester 2	Organic Layers - Preparation and Characterization	Possart	OSHC	3
	Methodology 6: Microstructural Mechanics and DamageMechanisms	Motz, Marx	MSMSM	3
	Nanostructural Physics 2	Hartmann		3
	3D Analysis of Micro and Nanostructures - Advanced Methods	Mücklich	3DMN2	3
	NanoBioMaterials 2	Arzt	NBM-2	3
	Methodology 7: Nano- and micromechanical testing methods	Motz	NMMMM	3
	High-Performance Ceramics	Falk	HLKer	3
	Material Modelling	Diebels	MaMo	4
	Methodology 3: High Resolution Microscopy I (SEM, EDS)	Motz	HMV1	4
	Laser Treatment of Materials - Applications	Mücklich	Las2	4
	Functional Materials II	Mücklich	FuWV	4
	Internship (Industry)	Motz, Marx	FPI	6
	Seminar Material Engineering	All Professors	SMWS	2 - 4
	Semester 3	Functional Coatings	Kraus	GuKBe
3D Analysis of Micro and Nanostructures - Basics		Mücklich	3DMN1	3
NanoBioMaterials 1		Arzt	NBM-1	3
High-Performance Ceramics		Falk	HLKer	3
Non-Destructive Testing of Materials II		Boller	ZfP2	3
Laser Treatment of Materials - Interaction with Matter		Mücklich	Las1	3
Methodology 4: High Resolution Microscopy II (TEM, SPM)		Motz	HMV2	3
Surface Engineering		Busch	OTech	3
Laboratory NanoBioMaterials		Arzt	NBM-P	4
Continuum Mechanics		Diebels	KonM	4
Thermodynamics of Heterogeneous Materials		Possart	ThS	5
Methodology 2: Basics of Microscopy and Spectroscopy		Motz	TeG	5
Theoretical Material Physics		Müser	TMP	5
Computer Simulation in Material Physics		Müser		8
Laboratory Materials Science		Motz, Marx	PrMW	4
Internship (Industry)		Motz, Marx	FPI	6
Seminar Material Science	All Professors	SMWW	2 - 4	
UPC				
Semester 2	Course	Responsible	Code	ECTS
	Not Available			
Semester 3	Biomedical Materials			4,5
	Surface Engineering			3
	Design, Ecodesign and Recycling	Maspoch		4,5
	Life Tissues,Substitutive Materials and Biointerfaces	Engel		5
	Nanotechnology	Cabrera		5
	Bioceramics	Ginebra		5
	Advanced Ceramics and Inorganic Composite Materials	Anglada		5
	Internship (Industry)	All Professors		5
Tutorised Research Work	All Professors		5	
LTU				
	Course	Responsible	Code	ECTS
	Biocomposites	Aitomäki	T7017T	7,5
	Nanomaterials	Soldatov	T7006T	7,5
	Advanced Materials Characterization Techniques	Akthar	T7003T	7,5
	Select 1 of the following (italic):			
	<i>Phase Transformations (semester 1)</i>	Akthar	T7008T	7,5
	<i>Laser Material Processing (semester 1)</i>	Kaplan	T0018T	7,5
	<i>Materials Mechanics (semester 1)</i>	Lindgren	T7016T	7,5
Semester 3	Bio/Nanomaterials (including Special Applications) - Project Work	All Professors	T7009T	27
UL				
Semester 2	Course	Responsible	Code	ECTS
	Not Available			
Semester 3	Not Available			

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