

Annex 2: Overall course description of FAME+ Master

M1 Grenoble INP HOME UNIVERSITY (first year students)

AUTUMN SEMESTER		
Course Name	ECTS	Module
FAM/e-project	5	Collaborative course with partners
Elaboration I	4	Fundamentals of materials science
Polymers	3	Fundamentals of materials science
Phase Transformation	2	Fundamentals of materials science
Microstructure & Properties	2	Fundamentals of materials science
Crystallography	2	Fundamentals of materials science
Solid state chemistry	2	Applied materials
Introduction to functional polymers	2	Applied materials
Functional materials physics	2	Applied materials
Numerical Methods	4	Modelling tools & materials
Materials families	2	Modelling tools & materials
TOTAL	30	
SPRING SEMESTER		
Course Name	ECTS	Module
FAM/e-project	5	Collaborative course with partners
Materials Characterisation	4	Applied materials
Semiconductor physics	2	Applied materials
Practical Lab Work	2	Applied materials
Elaboration II	3	Fundamentals of materials science
Material science for thin films	2	Fundamentals of materials science
Couches minces, Surfaces and interfaces	2	
Multi scale modelling	2	Modelling tools & materials
Business marketing	2	Professional training
Internship	6	Professional training
TOTAL	30	

M2 Grenoble INP HOME UNIVERSITY (second year students)

AUTUMN SEMESTER		
Course Name	ECTS	Module
Material and process selection	6	Applied projects
Modelling Numerical Modelling for Materials science	6	Applied projects
Multidisciplinary project	6	From materials to device
Practical works (Clean room)	4	From materials to device
Process flow for micro tech.	2	From materials to device
Packaging & Durability	2	From materials to device
Partnership negotiation	2	Professional training
Bibliographic project	2	Professional training
TOTAL	30	
SPRING SEMESTER		
Master Thesis	30	Professional training
TOTAL	30	

M1 TUDa HOME UNIVERSITY (first year students):

AUTUMN SEMESTER		
Course Name	ECTS	Module
FAM/e-project	4	Collaborative course with partners
Micromechanics for Materials Science*	6	Micromechanics for Materials Science
Surfaces and interfaces	5	Surfaces and interfaces
Research Lab I	4	Research Lab I
Functional Materials	6	Functional Materials
Computational Material science**	5	Computational Material science
TOTAL	30	
SPRING SEMESTER		
FAM/e-project	6	Collaborative course with partners
Advanced Characterization methods of Materials Science	6	Advanced Characterization methods of Materials Science
Theoretical Methods in Material Science	6	Theoretical Methods in Material Science
Internship (ARL) ***	12	Professional training
TOTAL	30	

* The Course “*Micromechanics for Materials Science*” can be replaced by the course “*Quantum Mechanics for Materials Science (6 ECTS)*”

** The Course “*Computational Material science*” can be replaced by any course of our Materials Science department which are listed in “*elective courses M. Sc. Materials Science*” in the TUCaN system. Students without a bachelor degree in Materials Science or Physics can also use the course “*Concepts in Materials Physics (6 ECTS)*” on request.

*** The Course “*Internship (Advanced Research Lab - FAME)*” with 12 ECTS can be replaced by a shorter *Internship (FAME)* with 8 ECTS and an *elective course* with 4 (ECTS) offered by our Materials Science department.

M2 TUDa HOME UNIVERSITY (second year students)

AUTUMN SEMESTER		
Course Name	ECTS	Module
Mandatory Courses		
Micromechanics for Materials Science*	6	Micromechanics for Materials Science
Research Lab I	4	Research Lab I
Elective courses***		
Advanced Microscopy	4	Advanced Microscopy
Ceramic Materials: Syntheses and Properties. Part II	4	Ceramic Materials: Syntheses and Properties. Part II
Computational Material science	5	Computational Material science
Course Processing of Conventional and Polymer Derived Silicon Ceramics	2	Course Processing of Conventional and Polymer Derived Silicon Ceramics
Electrochemistry in Energy Applications I: Converter Devices	4	Electrochemistry in Energy Applications I: Converter Devices
Engineering Microstructures	4	Engineering Microstructures
Focused Ion Beam Microscopy	4	Focused Ion Beam Microscopy
Fundamentals and Techniques of Modern Surface Science	4	Fundamentals and Techniques of Modern Surface Science
Magnetism and Magnetic Materials	4	Magnetism and Magnetic Materials
Materials Chemistry	4	Materials Chemistry
Mathematical Methods in Materials Science	4	Mathematical Methods in Materials Science
Mechanical Properties of Ceramic Materials	4	Mechanical Properties of Ceramic Materials

Mechanical Properties of Metals	4	Mechanical Properties of Metals
Polymer Materials	4	Polymer Materials
Quantum Mechanics for Materials Science	6	Quantum Mechanics for Materials Science
Semiconductor Interfaces	4	Semiconductor Interfaces
Solid State and Structural Chemistry of Materials	4	Solid State and Structural Chemistry of Materials
Transmission Electron Microscopy	3	Transmission Electron Microscopy
TOTAL	30	
SPRING SEMESTER		
Master thesis	30	Professional training
TOTAL	30	

* The Course "**Micromechanics for Materials Science**" can be replaced by the course "*Quantum Mechanics for Materials Science (6 ECTS)*"

*** All eligible "**Elective courses**" are listed in "*elective courses M. Sc. Materials Science*" in the TUCaN system. Only the following courses cannot be chosen: "Surfaces and Interfaces", "Materials Engineering", "Materials Science for Renewable Energy Systems" or "Advanced Research Lab". Students without a bachelor degree in Materials Science or Physics can also use the course "Concepts in Materials Physics (6 ECTS)" on request.

M2 University of Aveiro (second year students)

AUTUMN SEMESTER		
Course Name	ECTS	Module
Mandatory Courses		
Nanochemistry	6	
Project	12	Applied projects/ Professional training
Elective Courses (2 to select)		
Free selection from UA's list of electives of 2nd cycle		
Macromolecular Chemistry	6	
Spectroscopic Techniques	6	
Materials Characterization II	6	
Quantum Technologies	6	
Materials & Sustainability	6	
Advanced Materials & Biomimetics	6	
TOTAL	30	
SPRING SEMESTER		
Master thesis	30	Professional training
TOTAL	30	

M2 University of Bordeaux (second year students)

AUTUMN SEMESTER		
Course Name	ECTS	Module
Mandatory Lectures		
Hybrid and Nanomaterials	6	
Large Scale Facilities	6	
Elective Lectures		
Magnetic & Dielectric Properties	6	
Applied Nanosciences	6	
Photonics, Laser and Imaging	6	
Energy, Communication & Information	6	
Molecular Simulation	6	
Innovative & Composite Materials	6	
TOTAL	30	
SPRING SEMESTER		
Master thesis	24	
Bibliographic Project	6	
TOTAL	30	

M2 Université catholique de Louvain (second year students)

Depending on whether student spreads master thesis over two semesters or not, the courses are taken either in the first SEMESTER or in both the first and second SEMESTERS; the student selects 30 course credits in total.

Course Name	ECTS	Module
Mandatory Courses (these courses have to be followed only when no equivalent course was followed before by the student; otherwise, they are replaced by electives)		
Polymer Science and Engineering	5	
Physics of Functional Materials	5	
Physical Chemistry of Metal and Ceramics	5	
Deformation and Fracture of Materials	5	
Elective courses (other courses are possible, provided the student demonstrates the consistency of his/her curriculum)		
Physics of Nanostructures	5	Nanotechnology
Design of Micro- and Nano-Systems	5	Nanotechnology
Macromolecular Nanotechnology	5	Nanotechnology Polymers & Macromolecules
Micro- and Nano-Fabrication Techniques	5	Nanotechnology
Atomistic and Nanoscopic Simulations	5	Nanotechnology
Transport Phenomena in Solids and Nanostructures	5	Nanotechnology
Project in Polymer Science	5	Polymers & Macromolecules
Physical Chemistry and Chemistry of Polymers	5	Polymers & Macromolecules
Biomaterials	5	Biomaterials
Materials Selection	5	Mechanics of materials
SECOND SEMESTER (or spread over two semesters)		
Master thesis	28	
Master thesis seminar	2	
TOTAL	60	

M2 Université de Liège (second year students)

AUTUMN SEMESTER		
Course Name	ECTS	Module
Specialised courses		
Physics & chemistry of materials : complements	2	Research focus
Quantum Chemistry	4	Quantum materials: design and modelling
Physics of functional oxides	4	Quantum materials: design and modelling
Physics of nanomaterials	4	Quantum materials: design and modelling
Spectroscopy of materials	4	Quantum materials: design and modelling
Physics of magnetic materials	4	Quantum materials: design and modelling
Biohybrids : theory and modeling	4	Quantum materials: design and modelling
Quantum modeling of materials properties	4	Quantum materials: design and modelling
Molecular logic	2	Quantum materials: design and modelling
Macromolecular Chemistry	4	Functional materials and nanostructures: fabrication and characterization
Advanced solid state chemistry	4	Functional materials and nanostructures: fabrication and characterization
Nanomaterials, (electro)synthesis & applications	4	Functional materials and nanostructures: fabrication and characterization
Nanofabrication: principes and techniques	4	Functional materials and nanostructures: fabrication and characterization
Characterization of Biomaterials	4	Functional materials and nanostructures: fabrication and characterization
Characterization of nanostructures by scanning probe techniques	2	Functional materials and nanostructures: fabrication and characterization
Polymers and environment	2	Functional materials and nanostructures: fabrication and characterization
Introduction to solid state NMR	2	Functional materials and nanostructures: fabrication and characterization
Physics of semiconductors	2	Functional materials and nanostructures: fabrication and characterization
TOTAL	30	
SPRING SEMESTER		
General courses		
Research master thesis	15	
Research master thesis (complements)	15	
TOTAL	30	

M2 University of Augsburg (second year students)

AUTUMN SEMESTER		
Course Name	ECTS	Module
Mandatory Courses		
Laboratory Project	10	Conducting and Presenting Scientific Work
Elective Courses (3-4 to select)		
Advanced Solid State Materials	6	Materials Science Elective Topic
Applied Magnetic Materials and Methods	6	Materials Science Elective Topic
Biophysics and Biomaterials	6	Materials Science Elective Topic
Carbon-based functional Materials	6	Materials Science Elective Topic
Characterization of Composite Materials	6	Materials Science Elective Topic
Coordination Materials	6	Materials Science Elective Topic
Dielectric and Optical Materials	6	Materials Science Elective Topic
Fiber Reinforced Composites	6	Materials Science Elective Topic
Functional Polymers	6	Materials Science Elective Topic
Ion-Solid Interaction	6	Materials Science Elective Topic
Magnetism	6	Materials Science Elective Topic
Modern Metallic Materials	6	Materials Science Elective Topic
Nanostructures / Nanophysics	6	Materials Science Elective Topic
Non-Destructive Testing	6	Materials Science Elective Topic
Organic Semiconductors	6	Materials Science Elective Topic
Oxidation and Corrosion	6	Materials Science Elective Topic
Physics and Technology of Semiconductor Devices	6	Materials Science Elective Topic
Physics of Cells	6	Materials Science Elective Topic
Physics of Thin Films	6	Materials Science Elective Topic
Porous Functional Materials	6	Materials Science Elective Topic
Solid State NMR Spectroscopy and Diffraction Methods	6	Materials Science Elective Topic
Solid State Spectroscopy with Synchrotron Radiation and Neutrons	6	Materials Science Elective Topic
Spintronics	6	Materials Science Elective Topic
Superconductivity	6	Materials Science Elective Topic
TOTAL	30	
SPRING SEMESTER		
Master thesis	26	Finals
Colloquium	4	Finals
TOTAL	30	