Curriculum for the Master's Degree Programme

Advanced Materials Science

Curriculum 2022

This curriculum was approved by the Senate of the University of Graz at the meeting of June 29, 2022, and by the Senate of Graz University of Technology at the meeting of May 16, 2022.

The Master's Degree Programme Advanced Materials Science is a jointly offered degree programme (§ 51 (2) 27 Universities Act 2002) of the University of Graz (Uni Graz) and Graz University of Technology (TU Graz) within the framework of "NAWI Graz". The legal bases of this degree programme are the Universities Act 2002 (UG) and the Legal Regulations for Academic Affairs in the statutes of TU Graz and Uni Graz, as amended.

Please note: the English version of this document is a courtesy translation. Only the German version is legally binding.

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I General Information

§ 1 Subject matter of degree programme and qualification profile

The Master's Degree Programme Advanced Materials Science is comprised of four semesters. The total programme corresponds to 120 ECTS credits in accordance with § 54 (3) Universities Act 2002 (UG).

This Master's Degree Programme Advanced Materials Science is taught as a degree programme in the foreign language English in accordance with § 63a (8) of the Universities Act (UG).

Graduates of this study programme are awarded the academic degree ‘Diplom-Ingenieurin’ or ‘Diplom-Ingenieur’, abbreviated as ‘Dipl.-Ing.’ or ‘DI’. The international equivalent of this university degree is “Master of Science”, abbreviated: “MSc”.

(1) Subject matter of the degree programme

The Master's Degree Programme Advanced Materials Science provides students with an in-depth education in materials science along with founded knowledge and skills of related natural and engineering sciences. Particular focus is placed on interdisciplinary education and training, on promoting a critical view, and on considering materials and their properties comprehensively and from several different perspectives.

(2) Qualification profile and competencies

The Master’s Degree Programme Advanced Materials Science is awarded to students who have demonstrated the following knowledge, skills and competencies.

Knowledge and understanding
After successful completion of the master’s degree programme, graduates have acquired fundamental knowledge in the field of manufacturing, processing, characterising, modelling and applying materials. Graduates have deepened their subject-specific knowledge in one of the following specialisations:

- Metals and Ceramics
- Semiconductor Processing and Nanotechnology
- Biobased Materials

In particular, graduates of the Master’s Degree Programme Advanced Materials Science have the following competencies:

- broad knowledge of the fundamental principles of materials science and their technological application as well as sound knowledge of the materials, methods and strategies in materials science
- expertise developed by carrying out research work, which is documented in written form
- understanding of the most important research areas in their field of expertise
- experience in working on interdisciplinary scientific/technological problems

Application of knowledge and understanding
Graduates of the Master's Degree Programme Advanced Materials Science are able to apply their theoretical knowledge.

Specifically, they are able to:

- define and interpret the characteristics, limits, terminologies and schools of thought of their field
- apply general scientific and technological methods and models
- adapt familiar concepts for manufacturing of a wide range of materials, develop new technological methods and apply theoretical models
- prepare regulations as part of an experiment, describe the relevant set-up and perform all the necessary steps independently
- solve multidisciplinary scientific/technical assignments independently and creatively using an engineering-based application of materials science knowledge, both experimentally and theoretically
- select and apply suitable methods to solve a problem, and interpret their result
- develop solutions in project teams based on interdisciplinary studies in multidisciplinary cooperation and communication together with graduates of other degree programmes, such as Physics, Chemistry, Mechanical Engineering or Mathematics
- assess the risks involved in specific processes as well as in handling and using materials and products

Assessments
Graduates of the Master's Degree Programme Advanced Materials Science are able to

- review and improve the methods and technologies studied
- solve problems and carry out scientific research
- weigh arguments, assumptions, abstract concepts and data against each other to answer a complex question
- take into account the societal, social and ethical effects in their professional activities

Communicative and social skills
Graduates are able to

- apply modern communication and presentation techniques
- write scientific texts
- communicate information, ideas, problems and solutions in front of audiences of specialists or non-specialists

Organisational skills
Graduates are able to

- use learning strategies for autonomous learning and understand the importance of keeping their knowledge and skills up to date
- work independently as well as in teams

(3) Need and relevance of the degree programme for science and for the labour market

This master’s degree programme prepares students for a future career as materials scientists in natural sciences and technology. Graduates have learned how to complete a wide range of complex tasks for industry, research and public institutions, and to perform their activities responsibly and with critical thinking based on their knowledge and expertise. The master’s degree programme also provides students with the skills required for independent scientific work within the framework of a doctoral programme.

II General Provisions

§ 2 Admission requirements

(1) The following bachelor's degree programmes offered at the University of Graz or TU Graz are eligible for admission to the Master's Degree Programme Advanced Materials Science without further requirements:

- Bachelor's Degree Programme Chemistry
- Bachelor's Degree Programme Physics
- Bachelor's Degree Programme Mechanical Engineering
- Bachelor's Degree Programme Mechanical Engineering and Business Economics
- Bachelor's Degree Programme Chemical and Process Engineering
- Bachelor's Degree Programme Environmental Systems Sciences / Natural Sciences-Technology
- Bachelor's Degree Programme Biomedical Engineering
- Bachelor's Degree Programme Electrical Engineering
- Bachelor's Degree Programme Digital Engineering

(2) Graduates of degree programmes completed at a recognised domestic or foreign post-secondary educational institution may be admitted to the Master's Degree Programme Advanced Materials Science without further requirements if they can prove that the previously completed degree programme covers equivalent teaching content to the knowledge taught in the compulsory modules of the bachelor's degree programmes listed in (1), within a scope of at least 120 ECTS.

(3) For degree programmes that do not fall under (1) or (2) but are generally equivalent to a relevant degree programme (1) and only come short of full equivalence in a few specific aspects, full equivalence can be achieved by requiring applicants to complete additional courses and examinations from the bachelor's degree programmes listed in (1), up to a maximum amount of 30 ECTS credits.

(4) Degree programmes in which fewer than 60 ECTS credit points worth of courses related to the fields mentioned in (1) were completed or which would require more than 30 ECTS credit points worth of courses to establish equivalence to a subject-related degree programme are not considered equivalent to a subject-related degree programme.

(5) Proof of sufficient English language skills is a prerequisite for admission to the degree programme. The type of proof required is to be specified in regulations issued by the Rectorate of Graz University of Technology and of the University of Graz.

(6) In order to achieve a total of 300 ECTS credits in the postgraduate degree programme, the allocation of the same course is excluded both in the bachelor's degree programme that entitles the student to admission and in the master's degree programme in question.

§ 3 Allocation of ECTS credits

All study achievements completed by the students are allocated a certain amount of ECTS credit points. ECTS credit points reflect the workload of each course or assignment relative to the workload of an academic year, which is intended to be 1500 real hours corresponding to 60 ECTS credits (i.e., 25 actual hours per 1 ECTS credit). This workload includes both the time spent in self-study and the semester course hours. One semester course hour is equivalent to 45 minutes per week of the semester.

§ 4 Structure of the degree programme

The Master's Degree Programme Advanced Materials Science with a workload of 120 ECTS credits comprises four semesters. A total of 89 ECTS credit points are allocated to the courses, of which 6–12 ECTS credit points are allocated to free-choice courses. 30 ECTS credit points are allocated to the master's thesis and 1 ECTS credit point for the master's examination. Students must choose a specialisation to be completed in full. Each specialisation consists of a Module A (Theory and Application), a Module B (Laboratory) and a Module C (Elective Subject). The Master's Degree Programme Advanced Materials Sciences is structured in modules, as follows:

Module	ECTS
Module Group: Introduction Module 1A–1G	11–22 [1]
Module 2: Fundamentals of Materials Science	10
Module 3: Materials Characterisation and Materials Laboratory	10
Module Group: Specialisation Module 4A–4C: Metals and Ceramics *or* Module 5A–5C: Semiconductor Processing and Nanotechnology *or* Module 6A–6C: Biobased Materials Module A: Theory and Application Module B: Laboratory Elective Module C: Elective Subject	 15 6 12
Elective Module: General Electives and Soft Skills	7-12[1]
Free-choice courses	6-12[1]
Master Seminar	1
Master's thesis	30
Master's examination	1
Total	**120**

[1] ECTS credit points depend on the scope of the Introduction Module to be completed. A total of 35 ECTS credit points must be completed for the *Module Group Introduction*, *Elective Module: General Electives and Soft Skills* and Free-choice courses.

§ 5 Types of courses

The types of courses provided at Uni Graz and TU Graz are regulated in the statutes of these universities.

§ 6 Group sizes

The following maximum numbers of participants (group sizes) are stipulated for the following types of courses:

(1) For exercises (UE) and for the exercise parts of lectures with integrated exercises (VU), the maximum group size is 25.

(2) For laboratory courses (LU) the maximum group size is 6.

(3) For projects (PT) and seminars (SE) the maximum group size is 20.

§ 7 Guidelines for the allocation of places on courses

(1) If the number of students exceeds the number of available places, parallel courses must be provided. If necessary, these parallel courses may also be provided during the holidays and semester breaks.

(2) If it is not possible to provide enough 'parallel' courses (groups), then students must be allocated places on the course according to the following priority criteria:

a. The course is compulsory for the student as per the curriculum.

b. The total of the courses already completed in the student's current degree programme (total of ECTS credits)

c. Date on which a student fulfilled the participation criteria for the course (earlier date = higher priority)

d. Students who have already been deferred once or who have to repeat the course are to be given preferential admission to the next course to be held

e. The grade of the examination – or the grade average of examinations (weighted by ECTS credits) – in the course(s) required to be completed as admission criteria.

f. Students for whom the course is not required in order to complete their curriculum will only be admitted according to the availability of free places; they may be placed on a separate waiting list. The abovementioned provisions apply mutatis mutandis.

(3) Up to 10% of the existing places on the course are reserved for students completing part of their studies at a NAWI Graz university as part of a mobility programme.

III Course Content and Structure

§ 8 Modules, courses and semester allocation

The individual courses of this master's degree programme and their designation as part of either compulsory or elective modules are set out below. The knowledge, methods or skills to be taught in each course are described in detail in Appendix I. The allocation of courses to particular semesters should be adhered to, as this ensures that the sequence of courses is best able to build on prior knowledge and that the workload of an academic year does not exceed 60 ECTS credits. The allocation of the courses to the participating universities is defined in Appendix II and § 9.

Master's Degree Programme Advanced Material Science								
Module	**Course**	**SSt**	**Course Type**	**ECTS**	**Sem. ECTS credit points I**	**II**	**III**	**IV**
Module Group 1: Introduction								
Compulsory Module 1A Introduction Module for Students with a Bachelor's Degree in Chemistry								
[1A.1]	Basic Laboratory for Advanced Materials Science	2.67	LU	2	2			
[1A.2]	Introduction to Solid State Physics	2	VO	3	3			
[1A.3]	Introduction to Materials Science	2	VO	3	3			
[1A.4]	Introduction to Modelling and Simulation[1]	2	VU	3	3			
[1A.5]	Mathematics for Advanced Materials Science[2]	2	VU	2	2			
Subtotal Compulsory Module 1A		**10.67**		**13**	**13**			
Compulsory Module 1B: Introduction Module for Students with a Bachelor's Degree in Physics								
[1B.1]	Basic Laboratory for Advanced Materials Science	2.67	LU	2	2			
[1B.2]	Introduction to Materials Science	2	VO	3	3			
[1B.3]	Applied Chemistry I	1.33	VO	2	2			
[1B.4]	Applied Chemistry II	1.33	VO	2	2			
[1B.5]	Analytical Chemistry	2	VO	3	3			
Subtotal Compulsory Module 1B		**9.33**		**12**	**12**			
Compulsory Module 1C: Introduction Module for Students with a Bachelor's Degree in Mechanical Engineering or Mechanical Engineering and Business Economics								
[1C.1]	Basic Laboratory for Advanced Materials Science	2.67	LU	2	2			
[1C.2]	Introduction to Solid State Physics	2	VO	3	3			
[1C.3]	Atom Physics – Quantum Mechanics	1.33	VO	2	2			
[1C.4]	Applied Chemistry I	1.33	VO	2	2			
[1C.5]	Applied Chemistry II	1.33	VO	2	2			
[1C.6]	Analytical Chemistry	2	VO	3	3			
Subtotal Compulsory Module 1C		**10.66**		**14**	**14**			

[1] 2/3 of SSt = lecture part, 1/3 of SSt = exercise part
[2] 1/2 of SSt = lecture part, 1/2 of SSt = exercise part

Compulsory Module 1D: Introduction Module for Students with a Bachelor's Degree in Chemical and Process Engineering								
[1D.1]	Basic Laboratory for Advanced Materials Science	2.67	LU	2	2			
[1D.2]	Introduction to Solid State Physics	2	VO	3	3			
[1D.3]	Introduction to Materials Science	2	VO	3	3			
[1D.4]	Atom Physics – Quantum Mechanics	1.33	VO	2	2			
[1D.5]	Applied Chemistry II	1.33	VO	2	2			
Subtotal Compulsory Module 1D		**9.33**		**12**	**12**			
Compulsory Module 1E: Introduction Module for Students with a Bachelor's Degree in Environmental Systems Sciences / Natural Sciences-Technology or in Biomedical Engineering								
[1E.1]	Basic Laboratory for Advanced Materials Science	2.67	LU	2	2			
[1E.2]	Introduction to Solid State Physics	2	VO	3	3			
[1E.3]	Introduction to Materials Science	2	VO	3	3			
[1E.4]	Introduction to Modelling and Simulation[3]	2	VU	3	3			
Subtotal Compulsory Module 1E		**8.67**		**11**	**11**			
Compulsory Module 1F: Introduction Module for Students with a Bachelor's Degree in Digital Engineering								
[1F.1]	Basic Laboratory for Advanced Materials Science	2.67	LU	2	2			
[1F.2]	Introduction to Solid State Physics	2	VO	3	3			
[1F.3]	Introduction to Materials Science	2	VO	3	3			
[1F.4]	Atom Physics – Quantum Mechanics	1.33	VO	2	2			
[1F.5]	Applied Chemistry I	1.33	VO	2	2			
[1F.6]	Applied Chemistry II	1.33	VO	2	2			
[1F.7]	Analytical Chemistry	2	VO	3	3			
Subtotal Compulsory Module 1F		**12.66**		**17**	**17**			
Compulsory Module 1G: Introduction Module for Students with a Bachelor's Degree in Electrical Engineering								
[1G.1]	Basic Laboratory for Advanced Materials Science	2.67	LU	2	2			
[1G.2]	Introduction to Solid State Physics	2	VO	3	3			
[1G.3]	Introduction to Materials Science	2	VO	3	3			
[1G.4]	Atom Physics – Quantum Mechanics	1.33	VO	2	2			
[1G.5]	Applied Chemistry I	1.33	VO	2	2			
[1G.6]	Applied Chemistry II	1.33	VO	2	2			
[1G.7]	Analytical Chemistry	2	VO	3	3			
[1G.8]	Thermodynamik für USW	2	VO	3	3			
[1G.9]	Thermodynamik für USW[4]	1	UE	2	2			
Subtotal Compulsory Module 1G		**15.66**		**22**	**22**			
Compulsory Module 2: Fundamentals of Materials Science								
[2.1]	Introduction to Solid State Chemistry for Advanced Materials Science	1.33	VO	2	2			
[2.2]	Materials Production and Processing	2	VO	3				3
[2.3]	Modelling and Simulation for Advanced Materials Science[5]	2	VU	2		2		
[2.4]	Physical Properties of Materials	2	VO	3	3			
Subtotal Compulsory Module 2		**7.33**		**10**	**5**	**2**	**3**	

[3] 2/3 of SSt = lecture part, 1/3 of SSt = exercise part
[4] This course is held in German.
[5] 2/3 of SSt = lecture part, 1/3 of SSt = exercise part

Compulsory Module 3: Materials Characterisation and Materials Laboratory								
[3.1]	Materials Laboratory	4	LU	4		4		
[3.2]	Materials Characterization I	1.33	VO	2	2			
[3.3]	Materials Characterization II	1.33	VO	2	2			
[3.4]	Materials Characterization III	1.33	VO	2	2			
Subtotal Compulsory Module 3		**7.99**		**10**	**6**	**4**		
Module Group 4: Specialisation								
Specialisation: Metals and Ceramics Module 4A: Theory and Application								
[4A.1]	Plasticity and Forming Processes	2.67	VO	4		4		
[4A.2]	Corrosion and Corrosion Protection of Metallic Materials	2	VO	3			3	
[4A.3]	Functional Materials I	2	VO	3			3	
[4A.4]	High-Performance Metals and Alloys	1.33	VO	2		2		
[4A.5]	High-Performance Ceramics	2	VO	3		3		
Subtotal Compulsory Module 4A		**10**		**15**		**9**	**6**	
Specialisation: Metals and Ceramics Module 4B: Laboratory								
[4B.1]	Laboratory Course Metals and Ceramics	6	LU	6			6	
Subtotal Compulsory Module 4B		**6**		**6**			**6**	
Module Group 5: Specialisation								
Specialisation: Semiconductor Processing and Nanotechnology Module 5A: Theory and Application								
[5A.1]	Microelectronics and Micromechanics	2	VO	3		3		
[5A.2]	Organic Semiconductors	2	VO	3		3		
[5A.3]	Modelling and Simulation of Semiconductors[6]	2	VU	3		3		
[5A.4]	Surface Science	2	VO	3			3	
[5A.5]	Nanostructures and Nanotechnology	2	VO	3		3		
Subtotal Compulsory Module 5A		**10**		**15**		**12**	**3**	
Specialisation: Semiconductor Processing and Nanotechnology Module 5B: Laboratory								
[5B.1]	Laboratory Course Semiconductor Processing and Nanotechnology	6	LU	6			6	
Subtotal Compulsory Module 5B		**6**		**6**			**6**	
Module Group 6: Specialisation								
Specialisation: Biobased Materials Module 6A: Theory and Application								
[6A.1]	Bionanomaterials and Biomimetics	2	VO	3		3		
[6A.2]	Polymeric Biomaterials	2	VO	3			3	
[6A.3]	Soft Matter Physics	2	VO	3		3		
[6A.4]	Physical and Chemical Characterization of Biopolymers	2	VO	3			3	
[6A.5]	Biological and Biobased Materials	2	VO	3		3		
Subtotal Compulsory Module 6A		**10**		**15**		**9**	**6**	

[6] 2/3 of SSt = lecture part, 1/3 of SSt = exercise part

Specialisation: Biobased Materials **Module 6B: Laboratory**								
[6B.1]	Laboratory Course Biobased Materials	6	LU	6			6	
Subtotal Compulsory Module 6B		**6**		**6**			**6**	
Master Seminar								
	Master Seminar[7]	1	SE	1				1
Total of Compulsory Modules				**53–64**	**22–33**	**15–18**	**12–15**	**1**
Elective Module C **Elective Module General Electives and Soft Skills**				**12** **7–12**				
Total Elective Modules				**19–24**				
Free-choice subjects				**6–12**				
Master's thesis				**30**				**30**
Master's examination				**1**				**1**
Overall Total				**120**	**30–33**	**27–30**	**28**	**32**

§ 9 Elective modules

For the Elective Module *Elective Subject* of each specialisation, students must complete at least 12 ECTS credit points worth of courses from the course catalogue for the chosen specialisation (Specialisation Module).

For the Elective Module *General Electives and Soft Skills*, students must complete courses totalling 7–12 ECTS credit points (depending on the respective Introduction Module). Courses can be taken from any of the following catalogues, as well as from the respective Compulsory Module *Theory and Application* of the two specialisations not chosen. Soft Skills courses must be completed to the extent of 3–4 ECTS credit points. It is recommended that appropriate courses be selected from the *Soft Skills* catalogue of electives or foreign language courses listed below. Other relevant courses may also be recognised as soft skills after consultation with the officer responsible for study matters.

Students may elect a maximum of one *Project Laboratory* for the Master's Degree Programme Advanced Materials Science.

If the scope of the courses completed for the Elective Module *Elective Subject* of the chosen specialisation is higher or lower than ECTS credit point by one, the difference may be compensated for by a corresponding change in the scope for the Elective Module *General Electives and Soft Skills*.

Courses to improve competence in a second language (English or German) can be taken up to a value of 3 ECTS credits.

Please note: Each course is assigned to a participating university. Both universities are named if the course is offered at both universities in combination, in parallel or alternately.

[7] This course is assessed as "successful completed" or as "not completed".

Elective Module 4C: Elective Subject Metals and Ceramics							
Course		Course		Semester		Uni	TU
	SSt	Type	ECTS	WS	SS	Graz	Graz
Project Laboratory	8	PT	6	X	X	X	X
Structural Transformations and Diffusion in Materials[8]	3	VU	3		X		X
Joining Technology	2	VO	3	X			X
Werkstoffkunde Stahl für Advanced Materials Science[9]	1.33	VO	2	X			X
Failure Analysis[8]	2	VU	2		X		X
Structurally Complex Materials	2	VO	3	X			X
Electrical Engineering Materials	2	VO	3		X		X
Electro-Chemical Surface Refinement	2	VO	3	X			X
Advanced 2D and 3D Nanoanalysis	2	VU	3		X		X
Fracture Mechanics for Advanced Materials Science	1.33	VO	2	X			X
Surface Science	2	VO	3	X		X	
Laboratory Exercises in Computer Supported Measurement Techniques for Advanced Materials Science	2	LU	3	X			X
Materials Selection[8]	2	VU	2	X			X
Materials and the Environment[10]	2	VU	2	X			X
Introduction to Solid State Physics, Exercise	1	UE	1	X			X
Surface Technology and Wear	2	VO	3	X			X
Raw Materials Science	1.33	VO	2	X			X
Functional Materials II	0.66	VO	1		X		X
Additive Manufacturing and Joining Techniques in Aviation	2	VO	3		X		X
Fatigue Design Principles[10]	2	VU	2		X		X
Topics in Metals and Ceramics	2	VO	3	X	X	X	X

Elective Module 5C: Elective Subject Semiconductor Processing and Nanotechnology							
Course		Course		Semester		Uni	TU
	SSt	Type	ECTS	WS	SS	Graz	Graz
Project Laboratory	8	PT	6	X	X	X	X
Electron Transport in Mesoscopic Systems	2	VO	3		X		X
Structuring of Materials Surfaces and Functional Nanofabrication	2	VO	3	X			X
Physics of Semiconductor Devices	2	VO	3	X			X
Solid State Spectroscopy	2	VO	3		X		X
Thin Film Science and Processing	2	VO	3		X		X
2D Materials	2	VO	3		X	X	
Surface Chemistry	2	VO	3		X		X
IC Design Project Management and Quality	1	VO	1.5		X		X
HREM in Materials Science	2	VO	3		X		X

[8] 2/3 of SSt = lecture part, 1/3 of SSt = exercise part
[9] This course is held in German.
[10] 2/3 of SSt = lecture part, 1/3 of SSt = exercise part

Elective Module 4C: Elective Subject Metals and Ceramics							
Course		Course		Semester		Uni	TU
	SSt	Type	ECTS	WS	SS	Graz	Graz
Vacuum Technology	2	VO	3	X			X
Introduction to Solid State Physics, Exercise	1	UE	1	X		X	X
Nano Optics	2	VO	3		X	X	
Structured Light and Nanoscale Wave Phenomena	2	VO	3	X		X	
Scanning Probe Techniques	2	VO	3		X	X	
Synchrotron Radiation Techniques	2	VO	3	X		X	
X-Ray and Neutron Scattering	2	VO	3		X		X
Topics in Semiconductor Processing and Nanotechnology	2	VO	3	X	X	X	X

Elective Module 6C: Elective Subject Biobased Materials							
Course		Course		Semester		Uni	TU
	SSt	Type	ECTS	WS	SS	Graz	Graz
Project Laboratory	8	PT	6	X	X	X	X
Intermolecular Forces in Hybrid Materials	1.33	VO	2	X		X	
Renewable Resources – Chemistry and Technology I	1.33	VO	2		X	X	
Environmental Chemistry and Technology	2.66	VO	4	X		X	
Molecular Biophysics 2	2	VO	3	X		X	
Structure and Matter	1.33	VO	2	X		X	
Tissue Engineering	2	VO	3	X			X
Biophotonics	2	VO	3		X	X	
Computational Biomechanics[11]	4	VU	5.5		X		X
Characterization of Condensed Matter	1.33	VO	2	X		X	
Elemental Mass Spectrometry	1.33	VO	2		X	X	
Introduction into Simulation of Polymeric Materials	0.66	VO	1		X		X
Soft Matter Microscopy	2	VO	3		X		X
Milli and Micro Fluid Mechanics	2	VU	3		X		X
Molecular Biophysics 1	2	VO	3		X	X	
Biocompatible Materials	2	VU	3		X		X
Physics of Sustainable Energy	2	VO	3	X			X
High-Performance Polymers	1.33	VO	2		X		X
AI / Machine Learning for Data Analysis	2	VO	3		X	X	
Topics in Biobased Materials	2	VO	3	X	X	X	X

Courses with the title “Topics in [specialisation] (subtitle)” are assigned to the Elective Module [Title], whereby one semester course hour usually corresponds to 1.5 ECTS credit points. These courses have descriptive subtitles and are offered with a total scope of 1–3 semester course hours for a lecture-type course (VO) or 1–2 semester course hours for a lecture with integrated exercises (UE). Courses with different subtitles must be classified as different courses.

[11] 2/3 of SSt = lecture part, 1/3 of SSt = exercise part

Soft Skills
Courses to the extent of 3–4 ECTS credit points must be completed. Soft Skills courses are intended to convey interdisciplinary knowledge and skills, such as communication, organisation, presentation, IT or legal skills. This knowledge is important for the students' professional careers and is intended to supplement subject-specific education. A list of the approved courses is compiled and made available by the officer responsible for study matters. Other relevant courses may also be recognised as soft skills after consultation with the officer responsible for study matters. A foreign language course (German language courses for students whose first language is not German, English language courses for students whose first language is German) is strongly recommended.

§ 10 Free-choice subjects

(1) The courses to be completed as part of the free-choice subjects in the Master's Degree Programme Advanced Materials Science are designed to provide individual strategic focus and further development of the students. They may be freely selected from the courses offered by any recognised national or international universities and also recognised post-secondary educational institutions. Appendix III contains recommendations for specific free-choice courses.

(2) If a specific free-choice course does not have an allocation of ECTS credits, each semester hour (SSt.) of this course is counted as one ECTS credit. However, if such courses are lecture-type courses (VO), they are assigned 1.5 ECTS credit points for each semester course hour.

§ 11 Master's thesis

(1) The master's thesis serves to demonstrate that the student is able to work on topics in their subject independently and competently both in terms of the subject matter and in terms of methodology. The scope of the master's thesis must be determined in such a way that its completion can be reasonably and feasibly accomplished by the student within a period of six months.

(2) The subject of the master's thesis must be assigned to the chosen specialisation. Any exceptions are subject to approval by the officer responsible for study matters.

(3) The master's thesis must be registered before beginning work on it via the Dean's office with consultation of the relevant officer responsible for study matters. The subject, the field to which the subject is assigned, and the supervisor must be stated along with the name of the institute.

(4) 30 ECTS credits are allocated to the master's thesis.

(5) The master's thesis must be submitted for assessment.

§ 12 Admission requirements for courses/examinations

The condition for admission to the final master's examination before a committee is proof of positive results in all the assessment measures/examinations as described in § 8 to § 10 and a positive grade for the master's thesis.

The following prerequisite requirements for admission to courses must be met:

Course	Prerequisite
Laboratory Course Metals and Ceramics	Basic Laboratory for Advanced Materials Science
Laboratory Course Semiconductor Processing and Nanotechnology	Basic Laboratory for Advanced Materials Science
Laboratory Course Biobased Materials	Basic Laboratory for Advanced Materials Science

§ 13 Stays abroad and internships

(1) Recommended stays abroad

It is recommended for students to spend time abroad in the course of their studies. It is also possible to obtain recognition of work done in shorter study periods abroad, for example participation in summer or winter schools, as part of the free-choice subjects, by application to the officer responsible for study matters.

(2) Internships

It is possible to include professionally-oriented internships in the free-choice subject. Each week of full employment corresponds to 1.5 ECTS credit points. Active participation in an academic event may also count as an internship. This work experience must be relevant to the degree programme and must be approved by the officer responsible for study matters.

IV Examination Regulations and Completion of Studies

§ 14 Examination regulations

Courses are assessed individually.

(1) Examinations for courses held in the form of lectures (VO) must cover the entire contents of the course. Examinations can be oral-only, written-only or a combination of oral and written.

(2) In courses of the types lectures with integrated exercises (VU), exercises (UE), laboratory courses (LU), design exercises (KU), projects (PT), seminars (SE), seminar projects (SP) and excursions (EX), students' performance is measured by continuous assessment of work done by the students and/or by ongoing tests. The assessment must, at any rate, consist of at least two examinations.

(3) If a module is made up of multiple examination results, the overall grade for the module is to be calculated as follows:

a. The grade of each examination belonging to the module is multiplied by the ECTS credit points for the corresponding course.

b. The values calculated in point (a) are added together.

c. The result of the addition is divided by the sum of the ECTS credits of the courses.

d. The result of the division is rounded to a whole-numbered grade, if necessary. The grade must be rounded up if the decimal place exceeds 0.5. Otherwise, the grade must be rounded down.

e. A positive module grade may only be awarded if each individual examination performance has been assessed as positive.

f. Courses whose assessment consists only of "successful/unsuccessful participation" are not included in the calculation under points (a) to (d).

(4) The master's examination is an oral examination before a committee and consists of:

- The presentation of the master's thesis (max. 20 minutes).
- The defence of the master's thesis (examination interview).
- The oral examination on the selected subject-specific specialisation.

The module(s) is/are determined by the officer responsible for study matters of the university of admission based on the candidate's suggestion. The total duration of the master's examination before a committee is usually 60 minutes and must not exceed 75 minutes.

(5) The examination committee for the mater's examination includes the supervisor of the thesis and two other members who are nominated by the officer responsible for study matters, after hearing representations from the candidate, if any. The examination committee must be chaired by one of the members who is not the supervisor of the thesis. The members of the examination committee must not exclusively belong to one subject area.

(6) The examination committee determines the grade of this oral examination.

§ 15 Completion of studies

(1) The master's degree programme is completed once the student has achieved positive grades for the courses of all compulsory and elective modules as well as for the free-choice subjects, the master's thesis and the master's examination before the committee.

(2) A degree certificate is issued upon successful completion of the master's degree programme. The master's degree certificate for the Master's Degree Programme Advanced Materials Science is composed of:

a. a list of all the modules as set out in § 4 (along with their ECTS credits) and their assessment results,
b. the title and assessment of the master's thesis,
c. the grade of the master's examination before the committee,
d. the total of the ECTS credits of the free-choice subjects as defined in § 10, and
e. the overall assessment.

V Entry into Force and Transitional Regulations

§ 16 Entry into force

This 2022 curriculum (UNIGRAZonline and TUGRAZonline abbreviation 2022W) obtains legal validity on October 1, 2022.

§ 17 Transitional regulations

Students of the Master's Degree Programme Advanced Materials Sciences who are subject to the 2016 curriculum in its 2018 version when this curriculum enters into force on October 1, 2022, are entitled to complete their studies according to the provisions of the 2016 curriculum in its 2018 version by September 30, 2025. If the degree programme is not completed by September 30, 2025, students are subject to the curriculum for the Master's Degree Programme Advanced Materials Sciences as amended. Students are entitled to voluntarily opt for the new curriculum at any time within the admission periods. To this end, a written irrevocable declaration must be sent to the officers responsible for study matters.

Appendices to the curriculum of the Master's Degree Programme Advanced Materials Sciences

Appendix I – Module Descriptions and Modes of Assessment

Module 1A	**Introduction Module for Students with a Bachelor's Degree in Chemistry**
ECTS credits	13
Contents	• Basic experimental methods in the fields of physics and mechanical engineering • Fundamentals of solid-state physics and materials science • Advanced mathematical concepts and fundamentals of modelling and simulation
Learning outcomes	After completing the module, students are able to • use basic experimental techniques of the complementary fields of physics and mechanical engineering • understand the most important models and concepts of solid-state physics and materials science • understand advanced mathematical concepts and apply them to modelling and simulation problems • understand and classify other disciplinary approaches and views
Recommended prerequisites for participation	*None*
Teaching and learning activities and methods	Lectures, lectures with integrated exercises, laboratory courses
Frequency in which the module is provided	Every academic year

Module 1B	**Introduction Module for Students with a Bachelor's Degree in Physics**
ECTS credits	12
Contents	• Basic experimental methods in the fields of chemistry and mechanical engineering • Fundamentals of applied and analytical chemistry and materials science
Learning outcomes	After completing the module, students are able to • use basic experimental techniques of the complementary fields of chemistry and mechanical engineering • understand the most important models and concepts of applied and analytical chemistry and materials science • understand and classify other disciplinary approaches and views
Teaching and learning activities and methods	Lectures, laboratory courses
Recommended prerequisites for participation	*None*
Frequency in which the module is provided	Every academic year

Module 1C	Introduction Module for Students with a Bachelor's Degree in Mechanical Engineering or Mechanical Engineering and Business Economics
ECTS credits	14
Contents	• Basic experimental methods in the fields of physics and chemistry • Fundamentals of solid-state physics, atomic and quantum physics, and applied and analytical chemistry
Learning outcomes	After completing the module, students are able to • use basic experimental techniques of the complementary fields of physics and chemistry • understand the most important models and concepts of solid-state physics, atomic and quantum physics, and applied and analytical chemistry • understand and classify other disciplinary approaches and views
Teaching and learning activities and methods	Lectures, laboratory courses
Recommended prerequisites for participation	*None*
Frequency in which the module is provided	Every academic year

Module 1D	Introduction Module for Students with a Bachelor's Degree in Chemical and Process Engineering
ECTS credits	12
Contents	• Basic experimental methods in the fields of physics, chemistry and mechanical engineering • Fundamentals of solid-state physics, atomic and quantum physics, organic chemistry and materials science
Learning outcomes	After completing the module, students are able to • use basic experimental techniques of the complementary fields of physics, chemistry and mechanical engineering • understand the most important models and concepts of solid-state physics, atomic and quantum physics, organic chemistry and materials science • understand and classify other disciplinary approaches and views
Teaching and learning activities and methods	Lectures, laboratory courses
Recommended prerequisites for participation	*None*
Frequency in which the module is provided	Every academic year

Module 1E	Introduction Module for Students with a Bachelor's Degree in Environmental Systems Sciences / Natural Sciences-Technology or in Biomedical Engineering
ECTS credits	11
Contents	• Basic experimental methods in the fields of physics and mechanical engineering • Fundamentals of solid-state physics and materials science • Fundamentals of modelling and simulation
Learning outcomes	After completing the module, students are able to • use basic experimental techniques of the complementary fields of physics and mechanical engineering • understand the most important models of solid-state physics and materials science • understand advanced mathematical concepts and apply them to modelling and simulation problems • understand and classify other disciplinary approaches and views
Teaching and learning activities and methods	Lectures, lectures with integrated exercises, laboratory courses
Recommended prerequisites for participation	*None*
Frequency in which the module is provided	Every academic year

Module 1F	Introduction Module for Students with a Bachelor's Degree in Digital Engineering
ECTS credits	17
Contents	• Basic experimental methods in the fields of physics, chemistry and mechanical engineering • Fundamentals of solid-state physics, atomic and quantum physics, applied and analytical chemistry, and materials science
Learning outcomes	After completing the module, students are able to • use basic experimental techniques of the complementary fields of physics, chemistry and mechanical engineering • understand the most important models and concepts of solid-state physics, atomic and quantum physics, applied and analytical chemistry, and materials science • understand and classify other disciplinary approaches and views
Teaching and learning activities and methods	Lectures, laboratory courses
Recommended prerequisites for participation	*None*
Frequency in which the module is provided	Every academic year

Module 1G	Introduction Module for Students with a Bachelor's Degree in Electrical Engineering
ECTS credits	22
Contents	• Basic experimental methods in the fields of physics, chemistry and mechanical engineering • Fundamentals of solid-state physics, atomic and quantum physics, applied and analytical chemistry, materials science and thermodynamics
Learning outcomes	After completing the module, students are able to • use basic experimental techniques of the complementary fields of physics, chemistry and mechanical engineering • understand the most important models and concepts of solid-state physics, atomic and quantum physics, applied and analytical chemistry, and materials science • understand and classify other disciplinary approaches and views
Teaching and learning activities and methods	Lectures, lectures with integrated exercises, laboratory courses
Recommended prerequisites for participation	*None*
Frequency in which the module is provided	Every academic year

Module 2	Fundamentals of Materials Science
ECTS credits	10
Contents	• Fundamentals of solid-state chemistry such as solid-state synthesis, structure-property relationships, defect chemistry and transport processes • Fundamentals of manufacturing processes and processing methods for various classes of materials (metals, ceramics, polymers) • Physical properties of materials (electrical, optical, magnetic, thermal properties) • Advanced concepts and solution methods for modelling materials
Learning outcomes	After completing the module, students are able to • understand and apply the most important concepts and models in solid-state chemistry • describe the most important manufacturing processes and processing methods and understand the relationship between processes and material properties • fundamentally understand and describe the physical properties of materials • formulate a specific materials-science problem mathematically and translate it into an algorithm
Teaching and learning activities and methods	Lectures, laboratory courses
Recommended prerequisites for participation	*Recommended: all courses in the Module: Introduction*
Frequency in which the module is provided	Every academic year

Module 3	Materials Characterisation and Materials Laboratory
ECTS credits	10
Contents	• Basic experimental methods for manufacturing and characterisation of materials • Fundamentals of thermal and thermomechanical characterisation, electron and probe microscopy and spectroscopic methods (diffraction and scattering methods, surface spectroscopy, hyperfine structure methods) • Application of these methods to specific real-world materials science problems
Learning outcomes	After completing the module, students are able to • apply basic methods for manufacturing and characterising materials and assess the results • understand the concepts and experimental requirements of the characterisation methods • select suitable methods for a specific problem
Teaching and learning activities and methods	Lectures, laboratory courses
Recommended prerequisites for participation	*Recommended: all courses in the Module: Introduction*
Frequency in which the module is provided	Every academic year

Module 4A	Specialisation Metals and Ceramics: Theory and Application
ECTS credits	15
Contents	• Fundamentals of plastic deformation of metals and the associated forming processes • Corrosion and corrosion protection of materials • Fundamentals of electroceramics, energy materials, super-conductors and magnetic materials • Metallic and ceramic structural materials
Learning outcomes	After completing the module, students are able to • understand forming processes and their effects on material properties • understand and apply concepts and models of corrosion and corrosion protection • describe functional materials and their technological application • explain the properties and applications of structural high-performance materials • select and apply state-of-the-art synthesis and characterisation methods for specific material-physics problems
Teaching and learning activities and methods	Lectures
Recommended prerequisites for participation	*Recommended: all courses in the Module: Introduction*
Frequency in which the module is provided	Every academic year

Module 4B	Specialisation Metals and Ceramics: Laboratory
ECTS credits	6
Contents	• Laboratory courses on the synthesis and characterisation of metallic and ceramic materials
Learning outcomes	After completing the module, students are able to • select and apply state-of-the-art synthesis and characterisation methods for specific material-physics problems
Teaching and learning activities and methods	Laboratory course
Recommended prerequisites for participation	*Basic Laboratory for Advanced Materials Science* *Recommended: all courses in the Module: Introduction*
Frequency in which the module is provided	Every academic year

Elective Module 4C	Specialisation Metals and Ceramics
ECTS credits	12
Contents	• Selected topics in processing and characterisation of metallic and ceramic materials • Selected topics in materials science (functional materials, structural materials, surface technology) • Laboratory courses on computer-aided measurement technology, advanced synthesis and characterisation methods
Learning outcomes	After completing the module, students are able to • understand and apply selected processing and characterisation methods • understand and apply complex material concepts, and • select and apply advanced synthesis and characterisation methods for specific material-physical problems
Teaching and learning activities and methods	Lectures, lectures with integrated exercises, laboratory courses, project
Recommended prerequisites for participation	*Recommended: all courses in the Module: Introduction*
Frequency in which the module is provided	Every academic year

Module 5A	Specialisation Semiconductor Processing and Nanotechnology: Theory and Application
ECTS credits	15
Contents	• Basic processes of Si-planar technology, oxidation, epitaxy, lithography, etching, preparation steps of semiconductor devices and micromechanics devices • Fundamentals of manufacturing processes and processing methods for various classes of materials (metals, ceramics, polymers) • Physical properties of materials (electrical, optical, magnetic, thermal properties) • Advanced concepts and solution methods for modelling materials
Learning outcomes	After completing the module, students are able to • understand and apply the most important concepts and models in solid-state chemistry • describe the most important manufacturing processes and processing methods and understand the relationship between processes and material properties

	• fundamentally understand and describe the physical properties of materials • formulate a specific materials-science problem mathematically and translate it into an algorithm
Teaching and learning activities and methods	Lectures, lectures with integrated exercises
Recommended prerequisites for participation	*Basic Laboratory for Advanced Materials Science* *Recommended: all courses in the Module: Introduction*
Frequency in which the module is provided	Every academic year

Module 5B	**Specialisation Semiconductor Processing and Nanotechnology: Laboratory**
ECTS credits	6
Contents	• Laboratory courses on the manufacture and characterisation of semiconductors and nanomaterials
Learning outcomes	After completing the module, students are able to • select and apply state-of-the-art manufacturing and characterisation methods for specific material-physical problems
Teaching and learning activities and methods	Laboratory course
Recommended prerequisites for participation	*Basic Laboratory for Advanced Materials Science* *Recommended: all courses in the Module: Introduction*
Frequency in which the module is provided	Every academic year

Elective Module 5C	**Specialisation Semiconductor Processing and Nanotechnology**
ECTS credits	12
Contents	• Selected topics in semiconductor physics and nano-physics • Selected topics in characterisation of semiconductor materials and nanomaterials • Advanced design and manufacture methods of semiconductor devices • Laboratory courses on advanced synthesis and characterisation methods
Learning outcomes	After completing the module, students are able to • understand specific properties of semiconductor materials and nanomaterials • understand and apply complex design concepts for semiconductor devices • select and apply advanced manufacturing and characterisation methods for specific material-physical problems
Teaching and learning activities and methods	Lectures, lectures with integrated exercises, laboratory courses, project
Recommended prerequisites for participation	*Recommended: all courses in the Module: Introduction*
Frequency in which the module is provided	Every academic year

Module 6A	Specialisation Biobased Materials: Theory and Application
ECTS credits	15
Contents	• Fundamentals of biochemistry, biophysics and physics of soft matter • Methods of characterising biological and biobased materials, particularly biopolymers • Hierarchical structure and function of biological and biobased materials • Use of biocompatible materials in medical applications
Learning outcomes	After completing the module, students are able to • grasp interdisciplinary problems in the field of biobased materials • communicate concepts interdisciplinarily to specialists in physics, chemistry, materials science, biology and medicine • understand, evaluate and classify approaches and views from other scientific disciplines
Teaching and learning activities and methods	Lectures
Recommended prerequisites for participation	*Recommended: all courses in the Module: Introduction*
Frequency in which the module is provided	Every academic year

Module 6B	Specialisation Biobased Materials: Laboratory
ECTS credits	6
Contents	• Laboratory courses on the synthesis and characterisation of biological and biobased materials
Learning outcomes	After completing the module, students are able to • select and apply state-of-the-art synthesis and characterisation methods for specific material-physics problems
Teaching and learning activities and methods	Laboratory course
Recommended prerequisites for participation	*Basic Laboratory for Advanced Materials Science* *Recommended: all courses in the Module: Introduction*
Frequency in which the module is provided	Every academic year

Elective Module 6C	Specialisation Biobased Materials
ECTS credits	12
Contents	• Selected topics in the processing and characterisation of biological and biobased materials • Advanced biophysics and biochemistry methods • Laboratory courses on advanced synthesis and characterisation methods
Learning outcomes	After completing the module, students are able to • understand and apply selected processing and characterisation methods • understand and apply complex material and design concepts • select and apply advanced synthesis and characterisation methods for specific material-physical problems
Teaching and learning activities and methods	Lectures, lectures with integrated exercises, laboratory courses, project

Recommended prerequisites for participation	*Recommended: all courses in the Module: Introduction*
Frequency in which the module is provided	Every academic year

Elective Module	**General Electives and Soft Skills**
ECTS credits	7–12
Contents	• Additional subject-specific and non-subject-specific qualifications useful for the students' future career paths
Learning outcomes	After completing the module, students are able to • make better use of their potential in the technical, social, communicative and creative areas and to expand their skills
Teaching and learning activities and methods	Lectures, lectures with integrated exercise, seminars
Recommended prerequisites for participation	*Recommended: all courses in the Module: Introduction*
Frequency in which the module is provided	Every academic year

Appendix II – Recommended Curriculum Timeline

The courses marked with 1A, 1B, 1C, 1D, 1E, 1F and 1G are the subject of the Introduction Module to be completed (Introduction Module for Students with a Bachelor's Degree in (1**A**) Chemistry, (1**B**) Physics, (1**C**) Mechanical Engineering or Mechanical Engineering and Business Economics, (1**D**) Chemical and Process Engineering, (1**E**) Environmental Systems Sciences / Natural Sciences-Technology or Biomedical Engineering, (1**F**) Digital Engineering, and (1**G**) Electrical Engineering).

Courses that must be completed for a specific specialisation are marked with the corresponding module number (Specialisation Metals and Ceramics: 4A, 4B, Semiconductor Processing and Nanotechnology: 5A, 5B, Biobased Materials: 6A, 6B).

	SSt	Type	ECTS	Uni Graz[a)]	TU Graz[a)]
1st semester					
Basic Laboratory for Advanced Materials Science	2.67	LU	2	X	X
Introduction to Solid State Physics 1A,1C,1D,1E,1F,1G	2	VO	3	X	X
Introduction to Materials Science 1A,1B,1D,1E,1F,1G	2	VO	3		X
Introduction to Modelling and Simulation 1A,1E	2	VU	3		X
Mathematics for Advanced Materials Science 1A	2	VU	2		X
Applied Chemistry I 1B,1C,1F,1G	1.33	VO	2		X
Applied Chemistry II 1B,1C,1D,1F,1G	1.33	VO	2		X
Analytical Chemistry 1B,1C,1F,1G	2	VO	3		X
Atom Physics – Quantum Mechanics 1C,1D,1F,1G	1.33	VO	2	X	X
Materials Characterization I	1.33	VO	2		X
Materials Characterization II	1.33	VO	2		X
Materials Characterization III	1.33	VO	2	X	X
Introduction to Solid State Chemistry for Advanced Materials Science	1.33	VO	2		X
Physical Properties of Materials	2	VO	3		X
Elective modules and free-choice subjects			5–8 b)	X	X
1st semester total			30–33		
2nd semester					
Materials Laboratory	4	LU	4		X
Modelling and Simulation for Advanced Materials Science	2	VU	2		X
Plasticity and Forming Processes 4A	2.67	VO	4		X
High-Performance Metals and Alloys 4A	1.33	VO	2		X
High-Performance Ceramics 4A	2	VO	3		X
Microelectronics and Micromechanics 5A	2	VO	3		X
Organic Semiconductors 5A	2	VO	3		X
Modelling and Simulation of Semiconductors 5A	2	VO	3		X
Nanostructures and Nanotechnology 5A	2	VO	3		X
Bionanomaterials and Biomimetics 6A	2	VO	3	X	
Soft Matter Physics 6A	2	VO	3		X
Biological and Biobased Materials 6A	2	VO	3		X
Elective modules and free-choice subjects			12	X	X
2nd semester total			27–30		
3rd semester					
Materials Production and Processing	2	VO	3		X
Corrosion and Corrosion Protection of Metallic Materials 4A	2	VO	3		X
Functional Materials I 4A	2	VO	3		X
Laboratory Course Metals and Ceramics 4B	6	LU	6		X

Laboratory Course Semiconductor Processing and Nanotechnology 5B	6	LU	6	X	X
Surface Science 5A	2	VO	3	X	
Physical and Chemical Characterization of Biopolymers 6A	2	VO	3		X
Polymeric Biomaterials 6A	2	VO	3	X	
Laboratory Course Biobased Materials 6B	6	LU	6	X	X
Elective modules and free-choice subjects			16	X	X
3rd semester total			28		
4th semester					
Master's thesis seminar	1	SE	1	X	X
Master's thesis			30	X	X
Master's examination	1		1	X	X
4th semester total			32		
Total overall ECTS			120		

a) Assignment of the course to the participating universities. Both universities are named if the course is offered at both universities in combination, in parallel or alternately.
b) Depending on the Introduction Module to be completed

Appendix III – Recommended Free-Choice Courses

Free-choice courses can be freely chosen from among the courses offered at recognised domestic and foreign universities as well as at recognised domestic and foreign post-secondary educational institutions according to § 10 of this curriculum.

For students to broaden their knowledge in subjects relevant to the modules of this degree programme, courses in the fields of foreign languages, social competence, technological impacts assessment, sustainability, copyright and gender studies are recommended. In particular, the student's attention is directed toward offers provided by the service department Languages, Key Competencies and In-House Training at TU Graz, by Treffpunkt Sprachen at the University of Graz, by the Center for Social Competence and by the TIMEGATE programme at the University of Graz, and by the Science, Technology and Society Unit of TU Graz. The interdisciplinary master's degree modules "Master's Degree Plus" offered by the University of Graz are recommended in addition to the above.

Appendix IV – Recognition List

(1) The following table defines which courses from the expiring curriculum 2016 of the Master's Degree Programme Advanced Materials Science (in the version 2018) are equivalent to this current curriculum 2022. "↔" means that the two courses are equivalent, while e.g. "→" means that the course in the left column of the table may be recognised for the course in the right column of the table, but not vice versa.

Courses from the expiring curriculum 2016 in the version of 2018					**Courses from the current curriculum 2022**			
Course	**Course Type**	**SSt**	**ECTS**		**Course**	**Course Type**	**SSt**	**ECTS**
High-Performance Materials and Composites	VO	2.66	4	↔	High-Performance Metals and Alloys and High-Performance Polymers	VO VO	1.33 1.33	2 2
Topics in Metals and Ceramics	VO	2	3	↔	Raw Materials Science	VO	1.33	2
Topics in Metals and Ceramics: Additive Manufacturing and Joining Techniques in Aviation	VO	2	3	↔	Additive Manufacturing and Joining Techniques in Aviation	VO	2	3
Introduction to Biophysics and Biochemistry	VO	2	3	→	Bionanomaterials and Biomimetics	VO	2	3
Biocompatible Materials	VO	2	3	→	Polymeric Biomaterials	VO	2	3
Failure Analysis	VU	2	2	↔	Fatigue Design Principles	VU	2	2
Functional Materials II and High-Performance Materials and Composites	VO VO	0.66 2.66	1 4	↔	High-Performance Metals and Alloys and High-Performance Ceramics	VO VO	1.33 2	2 3
Structuring of Materials Surfaces Functional Nanofabrication	VO	2	2	↔	Structuring of Materials Surfaces Functional Nanofabrication	VO	2	3
Materials Selection	VU	2	3	↔	Materials Selection	VU	2	2

(2) Courses of the Elective Modules Elective Subject (4C, 5C, 6C) already completed for the previous curriculum 2016 in the 2018 version remain valid.

Appendix V – Glossary

Glossary of the terms used that differently in the statutes and guidelines of the two universities:

Term used in this curriculum (NAWI GRAZ)	**Uni Graz terminology**	**TU Graz terminology**
SSt.	KStd.	SSt.
Elective module		Elective subject
Free-choice courses	Free-choice courses	Free-choice course