INFORMATION ABOUT THE MATERIALS ENGINEERING STUDY PROGRAM

Version (valid from): 2024-1 (01. 10. 2024)

Basic data

Name of study programme	**Materials engineering**
Programme characteristics	
Type	University
Degree	First cycle
KLASIUS-SRV	Higher university education (first Bologna level)/higher university education (first Bologna level) (16204)
ISCED	• production technologies (54)
KLASIUS-P	• Metallurgy (5214)
KLASIUS-P-16	• Metallurgy, mechanical engineering and metallurgy (0715)
Frascati	• Technical sciences (2)
Raven SOK	Level SOK 7
Raven EOK	Level EOK 6
Raven EOVK	first cycle
Področja/moduli/smeri	• Ni členitve (študijski program)
University of Ljubljana members	• Faculty of Natural Sciences and Engineering, Aškerčeva cesta 12, 1000 Ljubljana, Slovenija
Duration (years)	3
Number of KT per year	60
Ways of conducting studies	regular, extraordinary

Basic objectives of the study program

The basic objectives of the first-level university undergraduate study program MATERIALS ENGINEERING are primarily:

To follow the needs and wishes of the national economy, and thus also the wishes of the student to acquire the necessary competences, which would guarantee him direct employability after the completion of his studies, and accordingly:

- to provide the graduate with broad fundamental natural science and engineering knowledge, especially high-quality knowledge in the field of materials and thus appropriate employability,
- the graduate gets a solid foundation of knowledge and understanding in the wider field of materials,
- the graduate is qualified for further studies at postgraduate level - II. degree,
- the graduate is sufficiently knowledgeable in the wider field of materials to be capable of interdisciplinary integration of various fields.

To follow the principles of the Bologna Declaration, the European Association of Universities EUA, the European Association of National Engineering Associations FEANI, as well as the German accreditation agency ASIIN, and thus enable European comparable knowledge and employment qualifications of graduates through a wide choice of subjects and mobility. According to that:

- the graduate receives an education that is comparable to related study programs in Central and Western Europe,

- the student is allowed to transfer to another related undergraduate study at home or abroad with a credit-evaluated statement of completed study obligations,
- with the transition conditions between study programs and the method of pedagogical work that encourages continuous study, as well as with the tutoring system, the conditions for a good study transition of students are guaranteed.

Candidates will acquire these skills and competences in a modern program, which, in addition to the classic forms of delivery of general and professional subjects, includes a lot of practical work and project tasks for solving problems. In their work, students will use modern experimental methods and information technologies, and based on the processing of results and their evaluation, they will prepare reports and present their achievements in front of colleagues and teaching staff of the faculty or invited persons from business, thus enriching their experience for professional work after completing their studies.

General Competencies (learning outcomes)

- Ability to define, understand and creatively solve professional challenges.
- Developing the ability of critical, analytical and synthesis thinking.
- Developing professional responsibility and ethics.
- Ability of professional communication and written expression, including the use of a foreign professional language.
- Ability to use modern research equipment and information and communication technology.
- Ability to use the acquired knowledge in the independent solution of technical problems and the search for innovative and inventive proposals in the field of materials engineering.
- Ability to search for sources, critically evaluate information, independently upgrade acquired knowledge and deepen knowledge in individual specialized areas of materials engineering.
- To acquire such a standard of knowledge and competences with which they will be able to enter the second cycle of sets of lectures or programs.
- Ability to work in a group and interdisciplinary integration.
- Ability to understand management principles and business practices.
- Compliance with safety, functional, economic and environmental protection principles in your work.
- Compliance with the engineering code.

Subject-specific competences (learning outcomes)

- In-depth knowledge of mathematics, physics and chemistry, with a developed ability to think in natural sciences.
- Mastering the basic professional knowledge essential for the technical field of materials engineering, with a developed ability for technical and innovative thinking.
- Ability to work in the laboratory using standard methodologies and the reliability of evaluating the obtained results.
- Collect and interpret relevant scientific data, and form a critical and ethical view of them.
- Independent performance of tasks on a research project.
- They know how to acquire knowledge to understand the practical applications of process and product technology.
- The ability to have a comprehensive view of technological processes of the process chain type.
- Ability to perform appropriate planning and problem solving procedures using scientific methods and tools in a given specialty area.
- Ability to convey information to a well-informed professional public in the Slovenian language.
- Ability to meet the requirements for initial employment in a general position in industry and development departments, which includes the area of production and use of materials.
- Developed learning skills for using learning aids (also in English).

Enrolment conditions

If a decision is made to restrict enrollment, they will
candidates from points a) and c) selected according to:
- general success in the general matriculation or final exam 60% points,
- general success in the 3rd and 4th year 40% points;
candidates from point b) selected according to:
- general success in the vocational matriculation exam 40% points,
- general success in the 3rd and 4th year 40% points,
- success in the general matriculation subject 20% points.

Criteria for the recognition of knowledge and skills acquired prior to enrolment in the program

Recognition of knowledge and skills, which in terms of content correspond to the Materials Engineering program acquired before enrollment, is considered by the Study Committee of the Department of Materials and Metallurgy, NTF or a body determined by the Faculty Senate, based on the student's written application, attached certificates and other documents proving successfully acquired knowledge and the content of this knowledge, and in accordance with the Rulebook on procedures and criteria for the recognition of informally acquired knowledge and skills from the 15th session of the Senate of the UL, 29/05/2007.

When recognizing knowledge acquired before enrollment, the designated authority will take into account

the following criteria:

• adequacy of the conditions for joining various forms of education (required prior education for inclusion in education),

• comparability of the scope of education (number of hours of prior education in relation to the scope of the subject), in which the obligation is recognised,

• the adequacy of the content of the education in relation to the content of the course for which the obligation is recognized.

Acquired knowledge can be recognized as a fulfilled obligation if the condition for inclusion in the education was consistent with the conditions for inclusion in the Metallurgical Technology program, if the previous education comprised at least 75% of the scope of the course and at least 75% of the content corresponded to the content of the course for which the study degree is recognized obligation. If the Study Committee determines that the acquired knowledge can be recognised, it is evaluated with the same number of ECTS credit points as the number of credit points in the course.

Assessment methods

The assessment methods are in accordance with the Statutom UL and specified in the curricula.

Course progression requirements

A student can enroll in a higher year if he has achieved 49 ECTS credit points by the end of the academic year. To enroll in the third year, all obligations from the first year (60 KT) and 49 credit points from the second year must have been completed. Exceptionally, a student can enroll in the senior year, even if he has not completed all the obligations specified in the study program for enrollment in the senior year, even if he has not achieved 49 ECTS credit points, when he has justified reasons for doing so, as specified in the UL Statute. Under the conditions from the previous paragraph, a student can enroll in a higher year if he collects at least 40 ECTS credit points. The Study Commission of the Department of Materials and Metallurgy (OMM), NTF, UL decides on the enrollment from the previous paragraph.

A student can repeat a year if he has collected the required 20 credit points for the year.

Conditions for transitions between programs

The transition between study programs is considered the termination of the student's education in the study program in which he was enrolled and the continuation of education in the new study program. Transfer from other university and higher education professional study programs to the first-cycle university study program Materials Engineering is possible if the candidate can be recognized for at least half of the obligations he completed in the first study program when enrolling in this study program.

1. Transitions from university study programs (accepted before 11.6.2004) and from first-cycle university study programs (accepted after 11.6.2004) to the first-cycle university study program Materials Engineering. The program is open to students of other comparable university programs, so you can apply in

the program is joined by students who have been trained in other university programs. A student who wishes to transfer to the Materials Engineering university study program submits an application with proof of completed obligations in the course of study to date and proof of meeting the conditions for enrollment in the study program. He joins the year for which he fulfills the transition conditions under this program, and must pass all those exams that are specific to this program. The request for transfer is decided by the Senate of the Faculty of Science and Technology, University of Ljubljana, or by a body determined by the Faculty Senate.

2. Transitions from higher education professional study programs (accepted before 11/06/2004) and from first-cycle higher education professional study programs (accepted after 11/06/2004) to the first-cycle university study program Materials Engineering. Students of the higher education professional program Metallurgical Technology who meet the conditions for enrollment in first-cycle university study programs can, based on the submitted documents, transfer to the corresponding year of the first-cycle university program Materials Engineering. They are given the missing obligations that they must complete if they want to graduate in the new program. In the event of a transition from the study program for obtaining a higher professional education to this study program, the candidate must also meet the conditions for enrollment in the first year of the university study program of the first level Materials Engineering.

3. Transfers from post-secondary study programs accepted before 1994 and the first-cycle university study program Materials Engineering. Graduates of the Metallurgical Technology post-secondary program accepted before 1994, who have 3 years of work experience, can transfer to the 3rd year. The missing obligations are determined for them, which they must complete before enrollment. Candidates who have completed may apply

any four-year high school program.

Transitions between programs are decided by the Senate of the Faculty of Science and Technology, or a body determined by the Faculty Senate.

Conditions for the completion of the study

In order to complete the 1st level of study, the student must complete the study requirements for all subjects of the enrolled study program, fulfill obligations in the amount of 180 KT and prepare and successfully defend the thesis in accordance with the provisions of the Regulations on the thesis, adopted by the Senate of the Faculty of Natural Sciences and Technology, University of Ljubljana.

Conditions for completing individual parts of the program, if the program contains them

The program is unified.

Professional or scientific or artistic title (male)

- B. Eng. in Materials Engineering

Professional or scientific or artistic title (female)

- B. Eng. in Materials Engineering

Professional or scientific or artistic title (name in English and abbreviation)

- B. Eng. in Materials Engineering

Professional or scientific or artistic title (name in English and abbreviation)

- Bachelor of Science (B.Sc.)

STUDY PROGRAMME CURRICULUM
MATERIALS ENGINEERING

2025/2026

Name of study programme	**Materials engineering**
Programme characteristics	
Type	academic
Cycle	bachelor
University of Ljubljana members	• Faculty of Natural Sciences and Engineering, Aškerčeva cesta 12, 1000 Ljubljana, Slovenija

Year 1, obvezni

				Contact hours									
	University Course Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study	Individual student work	Total hours	ECTS	Semesters	Elective
1.	0067586	Mathematics 1	izr. prof. dr. Janko Bračič	60	0	30	0	0	90	180	6	1st semester	no
2.	0067582	Physics 1	Marko Žnidarič	45	0	30	0	0	75	150	5	1st semester	no
3.	0067584	Chemistry 1	Urška Lavrenčič Štangar	60	0	15	0	0	75	150	5	1st semester	no
4.	0067591	Foundations of Mechanics	Pino Koc	45	0	30	0	0	75	150	5	1st semester	no
5.	0067590	Fundamentals of Engineering	prof. dr. Milan Terčelj, prof. dr. Tomaž Rodič	45	0	30	0	0	75	150	5	1st semester	no

6.	0067592	Programming Practicum	prof. dr. Goran Kugler	30	10	20	0	0	60	120	4	1st semester	no
7.	0067587	Mathematics 2	izr. prof. dr. Janko Bračič	60	0	30	0	0	90	180	6	2nd semester	no
8.	0067583	Physics 2	Borut Paul Kerševan	45	0	30	0	0	75	150	5	2nd semester	no
9.	0067585	Chemistry 2	Iztok Turel	45	0	30	0	0	75	150	5	2nd semester	no
10.	0067588	Materials and Their Properties	Mitja Petrič, prof. dr. Primož Mrvar	45	0	30	0	0	75	150	5	2nd semester	no
11.	0067593	Structure of Materials	prof. dr. Boštjan Markoli	45	0	30	0	0	75	150	5	2nd semester	no
12.	0067589	Materialographic Practicum	prof. dr. Boštjan Markoli	20	0	40	0	0	60	120	4	2nd semester	no
		Total		545	10	345	0	0	900	1800	60		

Year 2, obvezni

				Contact hours									
	University Course Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study	Individual student work	Total hours	ECTS	Semesters	Elective
1.	0067600	Heat and Mass Transfer	Borut Kosec	30	15	30	0	0	75	150	5	1st semester	no

2.	0067594	Physical Metallurgy 1	prof. dr. Boštjan Markoli	60	0	30	0	0	90	180	6	1st semester	no
3.	0067595	Mathematics 3	izr. prof. dr. Janko Bračič	30	0	30	0	0	60	120	4	1st semester	no
4.	0067596	Mechanics of Materials	prof. dr. Tomaž Rodič	45	0	30	0	0	75	150	5	1st semester	no
5.	0067603	Thermodynamics of Materials 1	izr. prof. dr. Maja Vončina, prof. dr. Jožef Medved	45	0	30	0	0	75	150	5	1st semester	no
6.	0067604	Practicals in Thermodynamics	izr. prof. dr. Maja Vončina, prof. dr. Jožef Medved	15	0	60	0	0	75	150	5	1st semester	no
7.	0067597	Numerical Modelling	Borut Kosec, prof. dr. Tomaž Rodič	30	15	30	0	0	75	150	5	2nd semester	no
8.	0067602	Production Systems in Solid State	prof. dr. Goran Kugler, prof. dr. Milan Terčelj	60	0	30	0	0	90	180	6	2nd semester	no
9.	0067599	Materials Testing	Matija Zorc, Milan Bizjak, prof. dr. Aleš Nagode	45	0	30	0	0	75	150	5	2nd semester	no

10.	0067598	Pyrometallurgy Of Iron And Iron Alloys	doc. dr. Matjaž Knap	45	0	30	0	0	75	150	5	2nd semester	no
11.	0067601	Process and Foundry Practicum	doc. dr. Tilen Balaško, Mitja Petrič, prof. dr. Primož Mrvar	15	0	60	0	0	75	150	5	2nd semester	no
12.	0111925	General optional course 01		30	0	30	0	0	60	120	4	2nd semester	no
		Total		450	30	420	0	0	900	1800	60		

Year 2, Splošni izbirni predmet 01

				Contact hours									
	University Course Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study	Individual student work	Total hours	ECTS	Semesters	Elective
1.	0100785	Introduction to Economic Analysis	Polona Domadenik	45	0	45	0	0	90	180	6		yes
2.	0100786	Project Management	ALJAŽ STARE	30	15	15	0	0	60	120	4		yes
3.	0100787	Principles of Marketing	Tomaž Kolar	30	30	0	0	0	60	120	4		yes
4.	0100788	Fundamentals OF Business Finance	Dušan Mramor	45	0	45	0	0	90	180	6		yes

5.	0100789	Company Management Leoben Economics	Jurij Šporin, prof. dr. Željko Vukelić	30	15	15	0	0	60	120	4		yes
6.	0100790	Environmental Economics	Bogomir Kovač	45	30	15	0	0	90	180	6		yes
7.	0643981	Information competences	doc. dr. Danica Dolničar	30	15	15	0	0	60	120	4	2nd semester	yes
8.	0643973	Circular economy of materials	doc. dr. Jože Kortnik, prof. dr. Jožef Medved	30	15	15	0	0	60	120	4	2nd semester	yes
9.	0643483	Business Communication	prof. dr. Andreja Jaklič	30	30	0	0	0	60	120	4	2nd semester	yes
		Total		315	150	165	0	0	630	1260	42		

Year 3, obvezni

				Contact hours									
	University Course Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study	Individual student work	Total hours	ECTS	Semesters	Elective
1.	0067606	Practicals in Energy and Workability	Borut Kosec, David Bombač, Peter Fajfar	15	15	45	0	0	75	150	5	1st semester	no
2.	0111927	Optional professional course 1		45	0	30	0	0	75	150	5	1st semester	no

3.	0111928	Optional professional course 2		45	0	30	0	0	75	150	5	1st semester	no
4.	0111929	Optional professional course 3		45	0	30	0	0	75	150	5	1st semester	no
5.	0111930	Optional professional course 4		45	0	30	0	0	75	150	5	1st semester	no
6.	0111931	Optional professional course 5		45	0	30	0	0	75	150	5	1st semester	no
7.	0067608	Company Organization and Management	prof. dr. Goran Kugler	45	15	15	0	0	75	150	5	2nd semester	no
8.	0067607	Modelling Practicum	prof. dr. Goran Kugler	15	0	60	0	0	75	150	5	2nd semester	no
9.	0067605	Diploma Work		0	0	0	0	150	150	300	10	2nd semester	no
10.	0111932	General optional course 02		45	0	30	0	0	75	150	5	2nd semester	no
11.	0111933	Optional professional course 6		45	0	30	0	0	75	150	5	2nd semester	no
		Total		390	30	330	0	150	900	1800	60		

Year 3, Strokovni izbirni 1-5: Tehnologije

	Contact hours	

	University Course Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study	Individual student work	Total hours	ECTS	Semesters	Elective
1.	0067614	Process Engineering in Steelmaking	doc. dr. Matjaž Knap	30	15	20	0	10	75	150	5	1st semester	yes
2.	0067615	Process Metallurgy of Non-ferrous Metals	prof. dr. Jožef Medved	45	0	20	0	10	75	150	5	1st semester	yes
3.	0067612	Foundry	Mitja Petrič, prof. dr. Primož Mrvar	45	0	30	0	0	75	150	5	1st semester	yes
4.	0067613	Materials Processing	David Bombač, Peter Fajfar	45	0	30	0	0	75	150	5	1st semester	yes
5.	0067616	Thermal Engineering	Borut Kosec	30	0	45	0	0	75	150	5	1st semester	yes
		Total		195	15	145	0	20	375	750	25		

Year 3, Strokovni izbirni 1 -5: Materiali

				Contact hours									
	University Course Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study	Individual student work	Total hours	ECTS	Semesters	Elective
1.	0067617	Physical Metallurgy of Steel	prof. dr. Aleš Nagode	45	0	30	0	0	75	150	5	1st semester	yes

2.	0067618	Physical Metallurgy of Non-ferrous Metals	prof. dr. Aleš Nagode	45	0	30	0	0	75	150	5	1st semester	yes
3.	0077526	Polymer Chemistry	Urška Šebenik	45	15	15	0	0	75	150	5	1st semester	yes
4.	0077525	Polymers	Matjaž Krajnc	45	15	15	0	0	75	150	5	1st semester	yes
5.	0067619	Ceramics	Andraž Kocjan, Tadej Rojac	45	0	30	0	0	75	150	5	1st semester	yes
6.	0067620	Composites	prof. dr. Aleš Nagode	30	30	15	0	0	75	150	5	1st semester	yes
		Total		255	60	135	0	0	450	900	30		

Year 3, Strokovni izbirni 6

				Contact hours									
	University Course Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other forms of study	Individual student work	Total hours	ECTS	Semesters	Elective
1.	0077542	Materials Recycling	doc. dr. Matjaž Knap, prof. dr. Jožef Medved	35	15	15	0	10	75	150	5	2nd semester	yes
2.	0077537	Measurements and Regulations	Borut Kosec, David Bombač,	30	0	45	0	0	75	150	5	2nd semester	yes

			Peter Fajfar										
3.	0067631	Special Forming Techniques	David Bombač, Peter Fajfar	45	0	30	0	0	75	150	5	2nd semester	yes
4.	0077540	Special Casting Techniques	prof. dr. Primož Mrvar	45	0	30	0	0	75	150	5	2nd semester	yes
5.	0077534	Physico-Chemical Basics of Soldering	Borut Zorc, prof. dr. Primož Mrvar	45	0	30	0	0	75	150	5	2nd semester	yes
6.	0067630	Corrosion and Corrosion Protection	prof. dr. Aleš Nagode, prof. dr. Jožef Medved	45	0	30	0	0	75	150	5	2nd semester	yes
7.	0077532	Archaeometallurgy	doc. dr. Matjaž Knap	45	15	15	0	0	75	150	5	2nd semester	yes
8.	0077533	Electrotechnics	Blaž Karpe, Milan Bizjak	45	0	30	0	0	75	150	5	2nd semester	yes
9.	0077539	Refractory Materials	doc. dr. Matjaž Knap, prof. dr.	45	0	30	0	0	75	150	5	2nd semester	yes

			Primož Mrvar										
10.	0077538	Powder Metallurgy	prof. dr. Aleš Nagode	30	15	30	0	0	75	150	5	2nd semester	yes
11.	0067632	Artistic Forming of Metal	David Bombač, Mitja Petrič, Peter Fajfar, prof. dr. Primož Mrvar	30	0	45	0	0	75	150	5	2nd semester	yes
12.	0077535	Industrial Furnaces	Borut Kosec	30	0	45	0	0	75	150	5	2nd semester	yes
13.	0077543	Technical English	Barbara Luštek Preskar, prof. angl. in nem.	45	0	30	0	0	75	150	5	2nd semester	yes
14.	0077591	Quality Management	Borut Kosec, prof. dr. Primož Mrvar	30	45	0	0	0	75	150	5	2nd semester	yes
15.	0553524	NANOTECHNOLOGIES AND NANOMATERIALS	prof. dr. Boštjan Markoli	35	10	30			75	150	5		yes

16.	0642785	Practice	David Bombač	0	0	75	0	0	75	150	5	2nd semester	yes
		Total		580	100	510	0	10	1200	2400	80		