

## THE “MECHANICAL ENGINEERING – RESEARCH AND DEVELOPMENT PROGRAMME” INFORMATION

### Basic information

Programme title	<b>Mechanical Engineering – Research and Development Programme</b>
Programme features	
Type	Master's degree
Study level (cycle)	Second cycle
KLASIUS-SRV	Master's education (second Bologna cycle)/Master's degree (second Bologna cycle) (17003)
ISCED	• Technics (52)
KLASIUS-P	• Mechanical engineering and metalworking (not further defined) (5210)
M KLASIUS-P-16	• Metallurgy, mechanical engineering and metalwork (0715)
Frascati	• Natural sciences (1) • Technical sciences (2) • Social sciences (5)
SOK level	SOK level 8
EOK level	EOK level 7
EOVK level	Second cycle
Fields/modules/courses of study	<ul style="list-style-type: none"> <li>• Energy engineering (course of study)</li> <li>• Process engineering (course of study)</li> <li>• Engineering design (course of study)</li> <li>• Mechanics (course of study)</li> <li>• Process engineering (course of study)</li> <li>• Mechatronics and laser technology (course of study)</li> </ul>
Member of the University of Ljubljana	• Faculty of Mechanical Engineering, Aškerčeva 6, 1000 Ljubljana, Slovenia
Duration (years)	2
Number of ECTS credits per year	60
Modes of study	Full-time

### Key objectives of the programme

In an effort to create the conditions for increased global competitiveness of the Slovenian economy, which is primarily based on the ability to constantly design and develop new products, process technologies and technological procedures, while taking into account the criteria of sustainable development and environmental protection, the primary objective of the second-cycle master's degree programme “MECHANICAL ENGINEERING – Research and Development Programme” is to educate future mechanical engineers who will be qualified for independent R&D and project-oriented work and generating new knowledge both in the field of mechanical sciences as well as areas that require interdisciplinary integration. Accordingly, the key factor of the programme is to address the needs and preferences of the national economy and, therefore, the students' needs to acquire the necessary competencies that will ensure immediate employability upon completion of the study programme. The main emphasis is on the following aspects:

- Students are allowed to acquire in-depth fundamental and specific technical engineering expertise, especially in the field of mechanical engineering; in this way, students are trained to assume professional responsibility in resolving challenging technical issues in practice, which often leads to new added value. Master's graduates in mechanical engineering – graduates of the second-cycle master's degree programme “MECHANICAL ENGINEERING – Research and Development Programme”, therefore become indispensable for the flourishing of the national economy.
- Students get a broader underpinning of knowledge and use the acquired skills to cover and master the core professional areas of mechanical engineering, while developing scientific thinking in their research work,

which is supported by the acquired methodological approaches. In this way, students are trained to handle R&D tasks; and finding solutions to these problems enables the enterprises to survive in international markets.

- Students are made aware of the importance of interdisciplinary integration by mastering new products and technologies. Through a wide range of knowledge, the ability to think analytically, the knowledge of methodologies, and by approaching research and development work in various professional areas of mechanical engineering, the master's graduates in mechanical engineering will be provided with both the expertise and the ability to connect different fields through interdisciplinary integration. This also fulfils the basic requirements for the successful continuation of their studies in a doctoral degree programme (third-cycle studies).

We strive to uphold the principles of the Bologna Declaration, the European University Association (EUA), the European Federation of National Engineering Associations (FEANI) and the German accreditation agency ASIIN. By providing a wide range of courses to choose from, which is expressed both in the number of professional courses in the study programme and in elective courses, as well as mobility, the programme enables our master's graduates in engineering to acquire skills and employment qualifications that are comparable across Europe. Accordingly:

- Students receive an education that is comparable to similar study programmes in Central and Western Europe.
- Students can transfer to another similar undergraduate study at home or abroad using a transfer credit statement of completed coursework.

The above-mentioned features enable our master's graduates in engineering – graduates of the second-cycle master's degree programme “MECHANICAL ENGINEERING – Research and Development Programme” to master specialized areas of expertise within the technical science field, which enables them to be employed and work successfully in the technical research and development departments of companies, in research laboratories of research institutes, in educational institutions, etc.

### General competencies (learning outcomes)

The general competencies as well as qualifications of a master's graduate in engineering after completing the second-cycle master's degree programme “MECHANICAL ENGINEERING – Research and Development Programme” include:

- the ability to define and understand fundamental scientific problems and creatively solve professional challenges;
- expanding the ability to think critically, analytically and synthetically; developing new knowledge and comprehension of his field of expertise; developing higher cognitive skills related to the generation of new knowledge;
- the ability to take responsibility for one's professional development and learning by evaluating and reflecting on one's work (experiential learning, supervision);
- independent participation in various social activities and freelance work;
- proficiency in professional communication and writing, including in the international arena;
- the ability to make use of information and communication technology;
- the ability to make use of the acquired knowledge to independently solve technical problems in the field of mechanical engineering;
- the ability to search for sources, critically assess information, independently expand the acquired knowledge and to broaden the skills in specific specialized areas of mechanical engineering;
- the ability to work in a group and take part in interdisciplinary networking; establishing partnerships with users and other groups; leadership and organisational skills;
- the ability to use modern research methods and procedures; the ability to do research and transfer the findings into practice.

### Course-specific competencies (learning outcomes)

The course-specific competencies of a master's graduate in engineering upon completing the second-cycle master's degree programme “MECHANICAL ENGINEERING – Research and Development Programme” are:

- the ability to upgrade and use basic mechanical engineering expertise and its development and technical implementation;
- proficiency in basic theoretical and applied knowledge, which is essential for mastering the technical field of mechanical engineering;
- great proficiency in the field of mechanical engineering, which enables the continuation of studies in a doctoral degree programme.
- proficiency in physical, mathematical and numerical problem modelling with a well-developed ability to critically analyse the results;
- the ability to independently acquire new expertise and skills;
- the ability to carry out independent research, development, engineering and technical organizational work and the ability to handle specific tasks in the field of mechanical engineering in a creative manner;
- a well-developed ability to find optimal solutions based on analysis and synthesis.

The specific competencies (more narrowly defined) are listed in the syllabi of individual courses.

### Entry requirements

The second-cycle master's degree programme "Mechanical Engineering – Research and Development Programme" can be entered by anyone who has completed at least:

- a first-cycle study programme, comprising of at least 180 credits, in the field of mechanical engineering with research and development content or an equivalent study programme pursuant to the current regulations in the Republic of Slovenia or abroad;
- a first-cycle study programme, comprising at least 180 credits, in the field of mechanical engineering with project-oriented content or an equivalent study programme pursuant to the current regulations in the Republic of Slovenia or abroad, if prior to enrolment, he has completed the requirements essential for continuing his studies ranging from 10 to 15 credits;
- a first-cycle study programme, comprising at least 180 credits, from other technical fields or an equivalent study programme pursuant to the current regulations in the Republic of Slovenia or abroad, if prior to enrolment, he has completed the requirements essential for continuing his studies. The fulfilment of these requirements-related conditions shall be determined by the Admissions Committee. Depending on the different areas of expertise, the credited requirements range from 10 to a maximum of 60 credits.

### Selection criteria in the event of admission quotas

In the event of admission quotas, the selection of candidates for enrolment in the study programme will take into account their academic performance in first-cycle studies (average grade and the diploma thesis grade). Where a diploma thesis is not part of the first-cycle study programme, only the average grade shall be taken into account.

### Criteria for the recognition of knowledge and skills acquired before enrolment in the programme

Before enrolling in the second-cycle master's degree programme "MECHANICAL ENGINEERING – Research and Development Programme", the students' previously acquired skills can be recognized as completed requirements if the content and scope of these skills correspond to the educational content of the subjects in this programme. The decision on whether or not to acknowledge the expertise and skills acquired by a particular student prior to enrolment is made by the UL FME Master's Studies Committee, based on the written application of the student, the attached written certificates and other documents proving the successfully acquired skills and the content of these skills, and in accordance with the Rules on the Procedure and Criteria for the Acknowledgement of Informally Acquired Knowledge and Skills.

The number of ECTS credits acquired outside of this study programme is not capped or limited. Upon enrolment in the second-cycle master's degree programme "MECHANICAL ENGINEERING – Research and Development Programme", the scope and content of comparable knowledge and skills are evaluated according to the ECTS system and, after the assessment of the Master's Studies Committee, recognized as completed requirements of the programme. This ensures that the range of professional content within the study programme, which is necessary for achieving the set objectives and competencies, is not reduced.

### Methods of assessment

The methods of assessment are compliant with [the UL Statute](#) and are listed in the course syllabi.

## Requirements for the progression through the programme

The prerequisite for progressing from 1st to 2nd year is the completion of the study requirements amounting to a minimum of 48 ECTS credits. Exceptionally, a student may enrol in the 2nd year of study even if he has not completed all the requirements required for enrolment in a higher year (as stipulated in the study programme), when there are justifiable grounds for doing so, as defined in Article 153 of the UL Statute (maternity, prolonged illness, extenuating family and social circumstances, disability status, active participation in top professional, cultural and sporting events and active participation in the bodies of the university) or reasons of study commitments to do with parallel studies, transferring from one university to another, language difficulties (foreign students), additional burdens due to international exchange or increased workload to do with additional research and development work. Pursuant to Article 240 of the UL Statute, students are entitled to suspend their student status during maternity, paternity or sick leave lasting over one year.

A student who has not fulfilled all the requirements set by the study programme for enrolment into a higher year may repeat a year if he has earned at least 24 ECTS credits. A year can only be repeated once during the studies.

## Conditions for transferring between programmes

The transfer between programmes shall mean the termination of the student's education in the study programme in which he initially enrolled and the continuation of education in the second-cycle master's degree programme "MECHANICAL ENGINEERING – Research and Development Programme", whereby part of the requirements or all of the requirements that the student has already passed as part of the initial study programme shall be deemed to have been completed. It should be noted, however, that transferring is only possible between study programmes that provide comparable competencies upon completion. Applications for transferring to the second-cycle master's degree programme "MECHANICAL ENGINEERING – Research and Development Programme" and the scope of satisfied requirements within the study programme will be reviewed by the Master's Studies Committee.

In accordance with the Criteria for Transfers Between Study Programmes, the candidate can enrol in the second-cycle master's degree programme "MECHANICAL ENGINEERING – Research and Development Programme", provided that he is entitled to at least half of the ECTS credits from the initial study programme pertaining to the compulsory subjects of the second-cycle master's degree programme "MECHANICAL ENGINEERING – Research and Development Programme". If, during the recognition procedure, the candidate is found to be entitled to at least as many (and specifically those) credit points that are the prerequisite for enrolment in the second year of the second-cycle master's degree programme "MECHANICAL ENGINEERING – Research and Development Programme", the candidate shall be allowed to enrol in the second year of the second-cycle master's degree programme "MECHANICAL ENGINEERING – Research and Development Programme".

## Requirements for the completion of studies

The prerequisite for completing the studies is that the candidate successfully completes all of the programme-specific study requirements amounting to 120 ECTS credits and successfully defends his master's thesis.

## Requirements for completing individual parts of the programme, if any exist:

There are no options to complete individual parts of the study programme. The programme is implemented and treated as a whole.

### Professional or scientific or artistic title (male)

- MSc in Mechanical Engineering

### Professional or scientific or artistic title (female)

- MSc in Mechanical Engineering

### Professional or scientific or artistic title (abbreviation)

- MSc, Mech. Eng.

### Professional or scientific or artistic title in English including abbreviation

- Master of Science (MSc, Mech. Eng.)

# STUDY PROGRAMME CURRICULUM

## MECHANICAL ENGINEERING - RESEARCH AND DEVELOPMENT PROGRAMME

Name of study programme	<b>Mechanical engineering - research and development programme</b>
Programme characteristics	
Type	master's
Cycle	master
University of Ljubljana members	<ul style="list-style-type: none"> <li>Faculty of Mechanical Engineering, Aškerčeva 6, 1000 Ljubljana, Slovenija</li> </ul>

Energy engineering (field of study)

Year 1

				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.	0566850	EXPERIMENTAL MODELING IN ENERGY AND PROCESS ENGINEERING	Marko Hočev ar, Matev ž Dular	30		30			65	125	5	1st semester	no
2.	0566851	ADVANCED COMBUSTION PROCESSES	Andrej Senega čnik, Tine Seljak, Tomaž Katraš nik	30		30			65	125	5	1st semester	no
3.	0566852	ENERGY CONVERSION SYSTEMS	Mihael Sekavč nik	30		30			65	125	5	1st semester	no
4.	0548392	Professional elective course S01		30		30			65	125	5	1st semester	yes
5.	0548393	Professional elective course S02		30		30			65	125	5	1st semester	yes
6.	0548394	General elective course 1		30		30			65	125	5	1st semester	yes
7.	0566856	Turbomachinery	Lovre nc Novak , Marko	30		30			65	125	5	2nd semester	no

			Hočev ar										
8.	05668 57	Processes in heat engines	Tomaž Katraš nik	30		30			65	12 5	5	2nd se mester	no
9.	05668 58	CHEMICA L ENERGY CARRIER S	Andrej Senega čnik	30		30			65	12 5	5	2nd se mester	no
1 0.	05484 01	Professiona l elective course S03		30		30			65	12 5	5	2nd se mester	yes
1 1.	05484 02	Professiona l elective course S04		30		30			65	12 5	5	2nd se mester	yes
1 2.	05484 03	General elective course 2		30		30			65	12 5	5	2nd se mester	yes
Total				360	0	360	0	0	780	15 00	60		

The professional elective courses S01, S02, S03 and S04 in the amount of 20 ECTS are selected by the student of his/her own choice from the set of all compulsory courses of other fields of study of the Master's study programme Mechanical Engineering – Research and Development Programme with the exception of the Energy Mechanical Engineering field of study.

The General elective courses 1 and 2 in the amount of 10 ECTS are chosen by the student at his/her own choice from the set of all compulsory courses of other fields of study of the Master's study programme Mechanical Engineering – Research and Development Programme with the exception of the Energy Engineering field of study, or at their own choice at any programme, faculty or university.

## Year 2

				Contact hours									
	Unive rsity Cours e Code	Course title	Lecture rs	Lect ures	Semi nar	Tuto rials	Clini cal tutor ials	Ot her for ms of stu dy	Indivi dual stude nt work	To tal ho urs	EC TS	Semest ers	Elec tive
1 .	05668 62	TECHNI CAL ACOUSTI CS	Jurij Prezelj	30		30			65	12 5	5	1st sem ester	no
2 .	05668 63	Electromo bility	Tomaž Katraš nik	30		30			65	12 5	5	1st sem ester	no
3 .	05668 64	Energy supply in circular economy	Mihael Sekavč nik, Tine Seljak, Tomaž Katraš nik	30		30			65	12 5	5	1st sem ester	no
4 .	05668 65	Sustainable sources of	Marko Hočeva r,	30		30			65	12 5	5	1st sem ester	no

		electric energy	Martin Petkovšek										
5.	0548411	Professional elective course S05		30		30			65	125	5	1st semester	yes
6.	0548412	Professional elective course S06		30		30			65	125	5	1st semester	yes
7.	0566826	RESEARCH IN MECHANICAL ENGINEERING	Andrej Bombač, Andrej Kitanovski, Andrej Senegačnik, Boris Jerman, Božidar Šarler, Damjan Klobčar, Davorin Kramar, Drago Bračun, Edvard Govekar, Franc Majdič, Franci Pušavec, Iztok Golobič, Janez Žerovnik, Janko Slavič, Jernej Kleme nc, Joško Valenti nčič, Jože Kutin, Jurij Prezelj, Lidija Slemenik Perše,	90		90			195	375	15	2nd semester	no

			Marko Hočeva r, Marko Nagode , Matija Jezerše k, Miha Bolteža r, Miha Brojan, Mihael Sekavč nik, Mirosla v Halilov ič, Mitjan Kalin, Niko Herako vič, Nikola Vukaši nović, Nikolaj Mole, Primož Podržaj , Robert Kunc, Rok Petkov šek, Rok Vrabič, Roman Šturm, Sašo Medve d, Tomaž Berlec, Tomaž Katrašn ik, Tomaž Pepelnj ak, Uroš Stritih										
8 .	05628 03	PROJECT PRACTIC UM - MAG	All course holders in the		15			80	30	12 5	5	2nd se mester	no



			progra mme										
9 .	05628 04	MASTER THESIS	All course holders in the progra mme		35			70	145	25 0	10	2nd se mester	no
		Total		270	50	270	0	150	760	15 00	60		

The Professional elective courses S05 and S06 in the amount of 10 ECTS are selected by the student of his/her own choice from the set of all compulsory courses of other fields of study of the Master's study programme Mechanical Engineering – Research and Development Programme with the exception of the Energy Engineering field of study.

# Process engineering (field of study)

Year 1

				Contact hours									
	Unive rsity Cours e Code	Course title	Lectur ers	Lect ures	Sem inar	Tuto rials	Clini cal tuto rials	Ot her form s of stu dy	Indivi dual stude nt work	To tal ho urs	EC TS	Semest ers	Elec tive
1.	05669 13	TRANSPOR T PHENOM ENA	Andre j Kitan ovski, Katja Klinar	30		30			65	12 5	5	1st sem ester	no
2.	05669 14	Thermodyn amics of mixtures	Iztok Golob iĉ, Matic Može	30		30			65	12 5	5	1st sem ester	no
3.	05669 15	SOLAR UTILITY TECHNOL OGIES	Sašo Medve d	30		30			65	12 5	5	1st sem ester	no
4.	05483 92	Professional elective course S01		30		30			65	12 5	5	1st sem ester	yes
5.	05483 93	Professional elective course S02		30		30			65	12 5	5	1st sem ester	yes
6.	05483 94	General elective course 1		30		30			65	12 5	5	1st sem ester	yes
7.	05669 19	AIR- CONDITI ONING, HEATING, REFRIGER ATION, VENTILAT ION	Uroš Stritih	30		30			65	12 5	5	2nd se mester	no
8.	05669 20	Computatio nal fluid dynamics	Boštja n Mavri ĉ, Božid ar Šarler	30		30			65	12 5	5	2nd se mester	no
9.	05669 21	Refrigeratio n and heat pumps - MAG	Andre j Kitan ovski	30		30			65	12 5	5	2nd se mester	no
10.	05484 01	Professional elective course S03		30		30			65	12 5	5	2nd se mester	yes

1 1.	05484 02	Professional elective course S04		30		30			65	12 5	5	2nd se mester	yes
1 2.	05484 03	General elective course 2		30		30			65	12 5	5	2nd se mester	yes
Total				360	0	360	0	0	780	15 00	60		

The professional elective courses S01, S02, S03 and S04 in the amount of 20 ECTS are selected by the student of his/her own choice from the set of all compulsory courses of other fields of study of the Master's study programme Mechanical Engineering – Research and Development Programme with the exception of the Process Engineering field of study.

The General elective courses 1 and 2 in the amount of 10 ECTS are chosen by the student at his/her own choice from the set of all compulsory courses of other fields of study of the Master's study programme Mechanical Engineering – Research and Development Programme with the exception of the Process Engineering field of study, or at their own choice at any programme, faculty or university.

#### Year 2

				Contact hours									
	Unive rsity Cours e Code	Course title	Lecture rs	Lect ures	Semi nar	Tuto rials	Clini cal tutor ials	Ot her for ms of stu dy	Indivi dual stude nt work	To tal ho urs	EC TS	Semest ers	Elec tive
1 .	05669 25	Heat exchangers	Andrej Kitano vski, Iztok Golobi č, Jaka Tušek, Jože Kutin	30		30			65	12 5	5	1st sem ester	no
2 .	05669 26	Process engineerin g	Iztok Golobi č, Matevž Zupanč ič	30		30			65	12 5	5	1st sem ester	no
3 .	05669 27	SMART CITIES	Andrej Kitano vski, Sašo Medve d	30		30			65	12 5	5	1st sem ester	no
4 .	05669 28	Multiphase Systems	Andrej Bomba č, Božidar Šarler	30		30			65	12 5	5	1st sem ester	no
5 .	05484 11	Profession al elective course S05		30		30			65	12 5	5	1st sem ester	yes
6 .	05484 12	Profession al elective course S06		30		30			65	12 5	5	1st sem ester	yes

7	05668	RESEARC H IN MECHAN ICAL ENGINE ERING	Andrej Bomba č, Andrej Kitano vski, Andrej Senega čnik, Boris Jerman, Božidar Šarler, Damja n Klobča r, Davori n Kramar , Drago Bračun, Edvard Goveka r, Franc Majdič, Franci Pušave c, Iztok Golobi č, Janez Žerovn ik, Janko Slavič, Jernej Kleme nc, Joško Valenti nčič, Jože Kutin, Jurij Prezelj, Lidija Slemen k Perše , Marko Hočeva r, Marko Nagode , Matija Jezerše k, Miha Bolteža	90		90			195	37 5	15	2nd se mester	no
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			r, Miha Brojan, Mihael Sekavčnik, Miroslav Halilović, Mitjan Kalin, Niko Heraković, Nikola Vukašinić, Nikolaj Mole, Primož Podržaj, Robert Kunc, Rok Petkovšek, Rok Vrabič, Roman Šturm, Sašo Medved, Tomaž Berlec, Tomaž Kutrašnik, Tomaž Pepelnjak, Uroš Stritih										
8.	0562803	PROJECT PRACTICUM - MAG	All course holders in the programme		15			80	30	125	5	2nd semester	no
9.	0562909	MASTER THESIS	All course holders in the programme		35			70	145	250	10	2nd semester	no
		Total		270	50	270	0	150	760	1500	60		

The Professional elective courses S05 and S06 in the amount of 10 ECTS are selected by the student of his/her own choice from the set of all compulsory courses of other fields of study of the Master's study programme Mechanical Engineering – Research and Development Programme with the exception of the Process Engineering field of study.

## Engineering design (field of study)

Year 1

	Unive rsity Cours e Code	Course title	Lectur ers	Contact hours					Indivi dual stude nt work	To tal ho urs	EC TS	Semest ers	Elec tive
				Lect ures	Semi nar	Tuto rials	Clini cal tutor ials	Ot her for ms of stu dy					
1.	05668 71	Engineerin g design techniques	Leon Kos, Nikola Vukaši nović	30		30			65	12 5	5	1st sem ester	no
2.	05668 72	Surface and contact engineerin g	Mitjan Kalin	30		30			65	12 5	5	1st sem ester	no
3.	05668 73	DESIGN OF ADVANC ED SYSTEMS	Jernej Kleme nc, Marko Nagod e	30		30			65	12 5	5	1st sem ester	no
4.	05483 92	Profession al elective course S01		30		30			65	12 5	5	1st sem ester	yes
5.	05483 93	Profession al elective course S02		30		30			65	12 5	5	1st sem ester	yes
6.	05483 94	General elective course 1		30		30			65	12 5	5	1st sem ester	yes
7.	05668 77	OPERATI ONAL STRENG TH	Dome n Šeruga, Jernej Kleme nc, Marko Nagod e	30		30			65	12 5	5	2nd se mester	no
8.	05668 78	Nanotech nologies	Mitjan Kalin	30		30			65	12 5	5	2nd se mester	no
9.	05668 79	Geometric Product Specificati ons	Robert Kunc, Samo Zupan	30		30			65	12 5	5	2nd se mester	no

10.	0548401	Professional elective course S03		30		30			65	125	5	2nd semester	yes
11.	0548402	Professional elective course S04		30		30			65	125	5	2nd semester	yes
12.	0548403	General elective course 2		30		30			65	125	5	2nd semester	yes
Total				360	0	360	0	0	780	1500	60		

The professional elective courses S01, S02, S03 and S04 in the amount of 20 ECTS are selected by the student of his/her own choice from the set of all compulsory courses of other fields of study of the Master's study programme Mechanical Engineering – Research and Development Programme with the exception of the Engineering design field of study.

The General elective courses 1 and 2 in the amount of 10 ECTS are chosen by the student at his/her own choice from the set of all compulsory courses of other fields of study of the Master's study programme Mechanical Engineering – Research and Development Programme with the exception of the Engineering design field of study, or at their own choice at any programme, faculty or university.

#### Year 2

				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.	0566883	Hydraulic components and systems	Franc Majdič	30		30			65	125	5	1st semester	no
2.	0566884	COMPLEX POWERTRANSFORMERS IN MOBILE MACHINERY	Jernej Klemenec, Marko Nagode, Simon Oman	30		30			65	125	5	1st semester	no
3.	0566885	LIGHTWEIGHT STRUCTURES	Boris Jerman	30		30			65	125	5	1st semester	no
4.	0566886	RELIABILITY EVALUATION AND DEMONSTRATION	Jernej Klemenec, Marko Nagode	30		30			65	125	5	1st semester	no
5.	0548411	Professional elective course S05		30		30			65	125	5	1st semester	yes
6.	0548412	Professional elective course S06		30		30			65	125	5	1st semester	yes
7.	0566826	RESEARCH IN	Andrej Bomba	90		90			195	375	15	2nd semester	no

[illegible]



			e, Matija Jezeršek, Miha Boltežar, Miha Brojan, Mihael Sekavčnik, Miroslav Halilović, Mitjan Kalin, Niko Heraković, Nikola Vukašinović, Nikolaj Mole, Primož Podržaj, Robert Kunc, Rok Petkovšek, Rok Vrabič, Roman Šturm, Sašo Medved, Tomaž Berlec, Tomaž Katrašnik, Tomaž Pepelnjak, Uroš Stritih										
8.	0562803	PROJECT PRACTICUM - MAG	All course holders in the programme		15			80	30	125	5	2nd semester	no
9.	0562867	MASTER THESIS	All course holders		35			70	145	250	10	2nd semester	no

			in the progra mme										
		Total		270	50	270	0	15 0	760	15 00	60		

The Professional elective courses S05 and S06 in the amount of 10 ECTS are selected by the student of his/her own choice from the set of all compulsory courses of other fields of study of the Master's study programme Mechanical Engineering – Research and Development Programme with the exception of the Engineering design field of study.

# Mechanics (field of study)

Year 1

				Contact hours									
	Unive rsity Cours e Code	Course title	Lectu rers	Lect ures	Semi nar	Tutor ials	Clini cal tutor ials	Ot her form s of stu dy	Indivi dual stude nt work	Tot al ho urs	EC TS	Semeste rs	Elect ive
1.	05668 92	Advanc ed strengt h of material s	Miha Broja n	30		30			65	125	5	1st seme ster	no
2.	05668 93	Advanc ed Dynam ics	Greg or Čepo n, Janko Slavič , Miha Bolte žar	30		30			65	125	5	1st seme ster	no
3.	05668 94	Mechan ics of structur al element s	Miros lav Halilo vič	30		30			65	125	5	1st seme ster	no
4.	05483 92	Professi onal elective course S01		30		30			65	125	5	1st seme ster	yes
5.	05483 93	Professi onal elective course S02		30		30			65	125	5	1st seme ster	yes
6.	05483 94	General elective course 1		30		30			65	125	5	1st seme ster	yes
7.	05668 98	FEM structur al analysis	Miros lav Halilo vič, Nikol aj Mole	30		30			65	125	5	2nd sem ester	no
8.	05668 99	Dynami cs of machin es and	Greg or Čepo n,	30		30			65	125	5	2nd sem ester	no

		structures	Miha Boltežar										
9.	0566900	Signal processing	Janko Slavič	30		30			65	125	5	2nd semester	no
10.	0548401	Professional elective course S03		30		30			65	125	5	2nd semester	yes
11.	0548402	Professional elective course S04		30		30			65	125	5	2nd semester	yes
12.	0548403	General elective course 2		30		30			65	125	5	2nd semester	yes
		Total		360	0	360	0	0	780	1500	60		

The professional elective courses S01, S02, S03 and S04 in the amount of 20 ECTS are selected by the student of his/her own choice from the set of all compulsory courses of other fields of study of the Master's study programme Mechanical Engineering – Research and Development Programme with the exception of the Mechanics field of study.

The General elective courses 1 and 2 in the amount of 10 ECTS are chosen by the student at his/her own choice from the set of all compulsory courses of other fields of study of the Master's study programme Mechanical Engineering – Research and Development Programme with the exception of the Mechanics field of study, or at their own choice at any programme, faculty or university.

## Year 2

				Contact hours									
	University Course Code	Course title	Lecturers	Lectures	Seminars	Tutorials	Clinical tutorials	Other forms of study	Individual student work	Total hours	ECTS	Semesters	Elective
1.	0566904	Mechanics of light-weight structures	Miha Brojan	30		30			65	125	5	1st semester	no
2.	0566905	Experimental modal analysis	Gregor Čepon, Janko Slavič	30		30			65	125	5	1st semester	no
3.	0566906	Rheology of polymers	Lidija Slemenik Perše	30		30			65	125	5	1st semester	no
4.	0566907	Numerical modelling of technological processes	Bojan Starman, Miroslav Halilović,	30		30			65	125	5	1st semester	no

			Nikolaj Mole										
5 .	05484 11	Professional elective course S05		30		30			65	12 5	5	1st semester	yes
6 .	05484 12	Professional elective course S06		30		30			65	12 5	5	1st semester	yes
7 .	05668 26	RESEARCH IN MECHANICAL ENGINEERING	Andrej Bombač, Andrej Kitanovski, Andrej Senegačnik, Boris Jerman, Božidar Šarler, Damjan Klobčar, Davorin Kramar, Drago Bračun, Edvard Govekar, Franc Majdič, Franci Pušavec, Iztok Golobič, Janez Žerovnik, Janko Slavič, Jernej Kleme nc, Joško Valenti nčič, Jože Kutin, Jurij Prezelj, Lidiја Slemenik Perše, Marko	90		90			195	37 5	15	2nd semester	no

			Hočeva r, Marko Nagode , Matija Jezerše k, Miha Bolteža r, Miha Brojan, Mihael Sekavč nik, Mirosla v Halilov ič, Mitjan Kalin, Niko Herako vič, Nikola Vukaši novič, Nikolaj Mole, Primož Podržaj , Robert Kunc, Rok Petkov šek, Rok Vrabič, Roman Šturm, Sašo Medve d, Tomaž Berlec, Tomaž Katrašn ik, Tomaž Pepelnj ak, Uroš Stritih										
8 .	05628 03	PROJECT PRACTIC UM - MAG	All course holders in the progra mme		15			80	30	12 5	5	2nd se mester	no

9	05628	MASTER THESIS	All course holders in the programme		35			70	145	250	10	2nd semester	no
		Total		270	50	270	0	150	760	1500	60		

The Professional elective courses S05 and S06 in the amount of 10 ECTS are selected by the student of his/her own choice from the set of all compulsory courses of other fields of study of the Master's study programme Mechanical Engineering – Research and Development Programme with the exception of the Mechanics field of study.

# Production engineering (field of study)

Year 1

				Contact hours									
	Unive rsity Cours e Code	Course title	Lectur ers	Lect ures	Semi nar	Tuto rials	Clini cal tuto rials	Ot her form s of stu dy	Indivi dual stude nt work	To tal ho urs	EC TS	Semest ers	Elec tive
1.	05668 29	Micromanufacturing technologies	Joško Valent inčič	30		30			65	12 5	5	1st semester	no
2.	05668 30	Advanced machining processes	Davorin Kramar, Franci Pušavec	30		30			65	12 5	5	1st semester	no
3.	05668 31	HEAT TREATMENT	Roman Šturm, Sebastjan Žagar	30		30			65	12 5	5	1st semester	no
4.	05483 92	Professional elective course S01		30		30			65	12 5	5	1st semester	yes
5.	05483 93	Professional elective course S02		30		30			65	12 5	5	1st semester	yes
6.	05483 94	General elective course 1		30		30			65	12 5	5	1st semester	yes
7.	05668 35	ADVANCED FORMING PROCESSES	Tomaž Pepelnjak	30		30			65	12 5	5	2nd semester	no
8.	05668 36	Assembly and Handling Systems	Marko Šimic, Mihael Debevec, Niko Herakovič	30		30			65	12 5	5	2nd semester	no
9.	05668 37	PRODUCT ION PLANNING AND ORGANIZATION	Tomaž Berlec	30		30			65	12 5	5	2nd semester	no



10.	0548401	Professional elective course S03		30		30			65	125	5	2nd semester	yes
11.	0548402	Professional elective course S04		30		30			65	125	5	2nd semester	yes
12.	0548403	General elective course 2		30		30			65	125	5	2nd semester	yes
Total				360	0	360	0	0	780	1500	60		

The professional elective courses S01, S02, S03 and S04 in the amount of 20 ECTS are selected by the student of his/her own choice from the set of all compulsory courses of other fields of study of the Master's study programme Mechanical Engineering – Research and Development Programme with the exception of the Production Engineering field of study.

The General elective courses 1 and 2 in the amount of 10 ECTS are chosen by the student at his/her own choice from the set of all compulsory courses of other fields of study of the Master's study programme Mechanical Engineering – Research and Development Programme with the exception of the Production Engineering field of study, or at their own choice at any programme, faculty or university.

Year 2

				Contact hours									
	University Course Code	Course title	Lecturers	Lectures	Seminars	Tutorials	Clinical tutorials	Other forms of study	Individual student work	Total hours	ECTS	Semesters	Elective
1.	0566841	QUALITY ENGINEERING	Davorin Kramar	30		30			65	125	5	1st semester	no
2.	0566842	CAM systems	Franci Pušavec, Peter Krajnik	30		30			65	125	5	1st semester	no
3.	0566843	ADDITIVE TECHNOLOGIES	Damjan Klobčar, Edvard Govekar	30		30			65	125	5	1st semester	no
4.	0566844	Smart factories	Marko Šimic, Miha Pipan, Niko Herakovič	30		30			65	125	5	1st semester	no
5.	0548411	Professional elective course S05		30		30			65	125	5	1st semester	yes
6.	0548412	Professional elective course S06		30		30			65	125	5	1st semester	yes
7.	0566826	RESEARCH IN	Andrej Bomba	90		90			195	375	15	2nd semester	no

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			r, Miha Brojan, Mihael Sekavčnik, Miroslav Halilović, Mitjan Kalin, Niko Heraković, Nikola Vukašinović, Nikolaj Mole, Primož Podržaj, Robert Kunc, Rok Petkovšek, Rok Vrabič, Roman Šturm, Sašo Medved, Tomaž Berlec, Tomaž Kutrašnik, Tomaž Pepelnjak, Uroš Stritih										
8.	0562824	PROJECT PRACTICUM - MAG	All course holders in the programme		15			80	30	125	5	2nd semester	no
9.	0562804	MASTER THESIS	All course holders in the programme		35			70	145	250	10	2nd semester	no
		Total		270	50	270	0	150	760	1500	60		

The Professional elective courses S05 and S06 in the amount of 10 ECTS are selected by the student of his/her own choice from the set of all compulsory courses of other fields of study of the Master's study programme Mechanical Engineering – Research and Development Programme with the exception of the Production Engineering field of study.

# Mechatronics and laser technology (field of study)

Year 1

				Contact hours									
	Unive rsity Cours e Code	Course title	Lectu rers	Lect ures	Sem inar	Tuto rials	Clini cal tuto rials	Ot her form s of stu dy	Indivi dual stude nt work	To tal ho urs	EC TS	Semest ers	Elec tive
1.	0566808	MICROPROCESSOR CONTROL	Dominik Kozjek	30		30			65	125	5	1st semester	no
2.	0566809	ROBOTIC SYSTEMS - MAG	Rok Vrabčič	30		30			65	125	5	1st semester	no
3.	0566810	ALGORITHMS AND PROTOCOLS	Dominik Kozjek	30		30			65	125	5	1st semester	no
4.	0548392	Professional elective course S01		30		30			65	125	5	1st semester	yes
5.	0548393	Professional elective course S02		30		30			65	125	5	1st semester	yes
6.	0548394	General elective course 1		30		30			65	125	5	1st semester	yes
7.	0566814	DISCRETE CONTROL SYSTEMS	Primož Podržaj	30		30			65	125	5	2nd semester	no
8.	0566815	LASER SYSTEMS	Matija Jezersšek	30		30			65	125	5	2nd semester	no
9.	0566816	PHOTONICS AND LASER SOURCES	Rok Petkovšek, Vid Agrež	30		30			65	125	5	2nd semester	no
10.	0548401	Professional elective course S03		30		30			65	125	5	2nd semester	yes
11.	0548402	Professional elective course S04		30		30			65	125	5	2nd semester	yes
12.	0548403	General elective course 2		30		30			65	125	5	2nd semester	yes
		Total		360	0	360	0	0	780	1500	60		

The professional elective courses S01, S02, S03 and S04 in the amount of 20 ECTS are selected by the student of his/her own choice from the set of all compulsory courses of other fields of study of the Master's study programme Mechanical Engineering – Research and Development Programme with the exception of the Mechatronics and laser technology field of study.

The General elective courses 1 and 2 in the amount of 10 ECTS are chosen by the student at his/her own choice from the set of all compulsory courses of other fields of study of the Master's study programme Mechanical Engineering – Research and Development Programme with the exception of the Mechatronics and laser technology field of study, or at their own choice at any programme, faculty or university.

#### Year 2

	Unive rsity Cours e Code	Course title	Lecture rs	Contact hours					Indivi dual stude nt work	To tal ho urs	EC TS	Semest ers	Elec tive
				Lect ures	Sem inar	Tuto rials	Clini cal tuto rials	Ot her for ms of stu dy					
1	05668 .20	LASER MEASURE MENT SYSTEMS	Matija Jezerše k	30		30			65	12 5	5	1st sem ester	no
2	05668 .21	LASER PROCESSI NG TECHNOL OGY	Matija Jezerše k, Peter Gregor čič	30		30			65	12 5	5	1st sem ester	no
3	05668 .22	ADVANCE D SENSORY SYSTEMS AND NETWORK S	Primož Podržaj	30		30			65	12 5	5	1st sem ester	no
4	05668 .23	MANUFAC TURING AUTOMAT ION	Drago Bračun	30		30			65	12 5	5	1st sem ester	no
5	05484 .11	Professional elective course S05		30		30			65	12 5	5	1st sem ester	yes
6	05484 .12	Professional elective course S06		30		30			65	12 5	5	1st sem ester	yes
7	05668 .26	RESEARCH IN MECHANI CAL ENGINEER ING	Andrej Bombač, Andrej Kitanovski, Andrej Senegačnik, Boris Jerman , Božidar Šarler,	90		90			195	37 5	15	2nd se mester	no

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			ič, Mitjan Kalin, Niko Herako vič, Nikola Vukaši nović, Nikolaj Mole, Primož Podrža j, Robert Kunc, Rok Petkov šek, Rok Vrabič, Roman Šturm, Sašo Medve d, Tomaž Berlec, Tomaž Katraš nik, Tomaž Pepelnj ak, Uroš Stritih										
8	05628 03	PROJECT PRACTICU M - MAG	All course holders in the progra mme		15			80	30	12 5	5	2nd se mester	no
9	05628 04	MASTER THESIS	All course holders in the progra mme		35			70	145	25 0	10	2nd se mester	no
Total				270	50	270	0	15 0	760	15 00	60		

The Professional elective courses S05 and S06 in the amount of 10 ECTS are selected by the student of his/her own choice from the set of all compulsory courses of other fields of study of the Master's study programme Mechanical Engineering – Research and Development Programme with the exception of the Mechatronics and laser technology field of study.