ASIIN Seal & EUR ACE Label

Accreditation Report

Bachelor's Degree Programmes
Mechanical Engineering - Project Oriented Applied Programme,
Mechanical Engineering – Research and Development Programme,

Master's Degree Programme
Ma Mechanical Engineering – Research and Development Programme

Provided by
University of Ljubljana

Version: 22.03.2024

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About the Accreditation Process

Name of the degree programme (in original language)	(Official) English translation of the name	Labels applied for [1]	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC)[2]
Visokošolski strokovni študijski program prve stopnje Strojništvo – projektno	1st Cycle Profes-sional Study Programme in Me-chanical Engineer-ing - Project Oriented Applied Pro-gramme	ASIIN, EUR-ACE® Label	ASIIN, EUR-ACE® Label 29.3.2019-30.9.2024	
Univerzitetni študijski program prve stopnje STROJNIŠTVO – Razvojno raziskovalni program	1st Cycle Academic Study Programme in Mechanical Engineering – Research and Development Programme	ASIIN, EUR-ACE® Label	ASIIN, EUR-ACE® Label 29.3.2019-30.9.2024	
Magistrski študijski program druge stopnje STROJNIŠTVO – Razvojno raziskovalni program	2nd Cycle Master's Study Programme in Mechanical Engi-neering – Re-search and Devel-opment Pro-gramme	ASIIN, EUR-ACE® Label	ASIIN, EUR-ACE® Label 29.3.2019-30.9.2024	

[1] [ASIIN Seal for degree programmes; EUR-ACE® Label: European Label for Engineering Programmes;

[2] TC: Technical Committee for the following subject areas: TC 01 - Mechanical Engineering/Process Engineering; TC 02 - Electrical Engineering/Information Technology; TC 03 - Civil Engineering, Geodesy and Architecture; TC 04 - Informatics/Computer Science; TC 05 - Materials Science, Physical Technologies; TC 06 - Engineering and Management, Economics; TC 07 - Business Informatics/Information Systems; TC 08 - Agriculture, Forestry, Food Sciences, and Landscape Architecture; TC 09 - Chemistry; TC 10 - Life Sciences; TC 11 - Geosciences; TC 12 - Mathematics; TC 13 - Physics.

Date of the contract: 14.03.2023 **Submission of the final version of the self-assessment report:** 23.06.2023 **Date of the onsite visit:** 22.-23.11.2023 **at: Ljubljana**	
Peer panel: Prof. Dr. rer. nat. Wolfgang H. Müller, Technical University Berlin; Prof. Dr.-Ing. Hartmut Ulrich, Ruhr- University Bochum; Dr.-Ing. Matthias Wunderlich, Renaul Group The student member had to cancel his participation shortly before the onsite visit.	
Representative of the ASIIN headquarter: Dr. Michael Meyer	
Responsible decision-making committee: Accreditation Commission for Degree Programmes	
Criteria used: European Standards and Guidelines as of May 15, 2015 ASIIN General Criteria, as of December 10, 2015 Subject-Specific Criteria of Technical Committee 01 – Mechanical Engineering/Process Engineering as of March 21, 2021.	

Characteristics of the Degree Programmes

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corresponding level of the EQF[3]	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
1st Cycle Professional Study Programme in Mechanical Engineering - Project Oriented Applied Programme	DIPLOMIRANI INŽENIR STROJNIŠTVA (VS) / Bachelor of Applied Science (B.A.Sc.)	Energy Engineering, Process Engineering, Design of Machines and Devices, Design of Industrial Systems, Production Technologies, Production Engineering, Airline Transport Pilot, Aircraft Design and Maintenance, Mechatronics.	EQF level 6	Full time	No	6 semesters (3 years)	180 ECTS	First time of offer: school year 2009/2010
1st Cycle Academic Study Programme in Mechanical Engineering – Research and Development Programme	DIPLOMIRANI INŽENIR STROJNIŠTVA (UN) / Bachelor of Science (B.Sc.)	The Study Programme is the same for all students (no specified specialisation).	EQF level 6	Full time	No	6 semesters (3 years)	180 ECTS	First time of offer: school year 2008/2009
2nd Cycle Master's Study Programme in Mechanical Engineering – Research and Development Programme	MAGISTER INŽENIR STROJNIŠTVA / Master of Science (M.Sc.)	Engineering Design, Mechanics, Energy Engineering, Process Engineering, Production Engineering, Mechatronics and Laser Technology.	EQF level 7	Full time	No	4 semesters (2 years)	120 ECTS	First time of offer: school year 2011/2012

[3] EQF = The European Qualifications Framework for lifelong learning

The University of Ljubljana is the biggest university in Slovenia with 23 faculties and some 38000 students. Within the university the Faculty of Mechanical Engineering is divided into 16 Chairs with around 1600 students. Each year around 400 students finish their studies successfully at the faculty.

For the Bachelor's degree programme Mechanical Engineering - Project Oriented Applied Programme the institution has presented the following profile in the self-assessment report.

Primary objectives of the programme

The first basic objective of the accredited study programme is to address the needs and requirements of the national economy, and thus the students' needs to acquire the competencies that will ensure immediate employability after graduation, and:

- to provide the graduate with basic engineering knowledge and necessary useful knowledge in the chosen specialisation of mechanical engineering and thus appropriate employability;
- to enable the graduate to understand the acquired knowledge in mechanical engineering;
- to equip the graduate with sufficient knowledge in the wider field of mechanical engineering to work in an interdisciplinary manner with specialists in other fields.

In order to fully achieve the desired objectives of the programme, the focus is on the following:

We want to enable our students to acquire the necessary basic skills and to include all essential technical expertise, divided according to the courses of study, while also emphasizing the interdisciplinary of mechanical engineering and linking and upgrading these skills in a project-oriented course of study. This way, we want to encourage our students to excel in their practical work or to continue their studies in the second-cycle study programme. Students also acquire the necessary skills of modern technical computer-aided communication and computational analysis.
We want our students to consciously develop (through appropriate methodological approaches) their scientific critical thinking, which represents the foundation for later professional work.

General competencies (learning outcomes)

- the ability to apply the acquired knowledge into practice,

- the ability to work independently within the chosen field of study,
- the ability to manage time,
- the ability to break down easier professional tasks into sub-tasks,
- developing the ability to think critically and self-critically,
- the ability to work in a group and interdisciplinary networking with experts from other disciplines,
- the ability to manage a technology unit or project,
- the adaptability to changed situations at work,
- compliance with safety, functional, economic and environmental principles in their work,
- the ability to communicate professionally and in writing,
- the ability to present technical issues and their solutions in their community and beyond,
- the ability to use information and communication technologies;
- the ability to search for sources of knowledge, selecting these sources and applying the newly acquired knowledge in their work,
- the familiarity with relevant technical in English or German,
- developing professional responsibility and ethics,
- compliance with the engineering code.

Subject-specific competences (learning outcomes)

The subject-specific competencies of the graduate after completing the higher professional study programme are:

- understanding the physical laws and phenomena underpinning the functions of products and technologies,
- proficiency in the most important concepts of advanced mathematics and numerical mathematics,
- proficiency in basic technical expertise in the field of mechanical engineering and essential complementary sciences,
- familiarity with basic measuring instruments and the measurement chain for measuring basic quantities in the field of mechanical engineering,
- familiarity with the main environmental restrictions and issues,
- proficiency in independent project work,
- familiarity with certain necessary software tools for computer data processing,
- proficiency in the basic and necessary specific expertise in the chosen field of study,

- the capacity for independent development-oriented, engineering and skilled organizational work and solving specific well-defined tasks in the field of mechanical engineering,
- specific competencies, which are listed in specific course syllabi. Graduates master sufficient basic engineering knowledge and specific knowledge of the chosen field of mechanical engineering to further develop and enhance their knowledge and skills and to increase the range of eligible positions of responsibility.

For the Bachelor's degree programme Mechanical Engineering - Research and Development Programme the institution has presented the following profile in the self-assessment report.

Primary objectives of the programme

The programme is intended as the initial level of studies in acquiring the necessary competencies. The core objectives of the first-cycle undergraduate Research and Development Programme are primarily:

Addressing the needs and requirements 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, and accordingly: – providing graduates with broad basic engineering knowledge, especially high-level expertise in the field of mechanical engineering, thus ensuring:

suitable employability,

- graduates receive a solid foundation in expertise and understanding within the broader field of mechanical engineering,
- graduates are qualified for further studies at the postgraduate level – second cycle,
- graduates are sufficiently knowledgeable in the broader field of mechanical engineering so as to be capable of linking up different interdisciplinary fields.
- To achieve the intended objectives of the programme to the fullest possible extent, the emphasis is on:
- enabling students, first and foremost, to acquire in-depth fundamental physical and general professional technical expertise in the field of mechanical engineering, as well as the skills needed for modern technical computer-aided communication and computational analysis. There is a special emphasis on building an in-depth understanding of the laws of physical phenomena and their use and implementation in technically designed systems. .

- developing scientific-critical thinking, which is the basis for later research work. By analysing results of examples of relatively simple technical problems

General competencies (learning outcomes)

- the ability to define, understand and creatively solve professional challenges;
- developing the ability of critical, analytical and synthetic thinking;
- developing professional responsibility and ethics;
- proficiency in professional communication and writing, including the use of a foreign professional language ;
- the ability to use information and communication technology;
- the ability to use the acquired knowledge in independent solving of technical problems in mechanical engineering;
- the ability to find sources, critically assess information, independently upgrade acquired knowledge and broaden their knowledge of individual specialised fields of mechanical engineering;
- the ability to work in a group and interdisciplinary networking;
- observance of safety, functional, economic and environmental principles in their work.
- compliance with the Engineering Code of Ethics.

Subject-specific competencies (learning outcomes)

- mastery of basic theoretical knowledge essential for the technical field of mechanical engineering.
- mastery of basic technical knowledge in mechanical engineering and essential complementary sciences (metallurgy, informatics and organisational sciences).
- a solid skills base in mechanical engineering enabling continuation of studies in the second cycle.
- the ability to independently acquire new knowledge and skills.
- the capacity for independently performing less demanding developmental, engineering and professional organisational work and solve individual well-defined tasks in mechanical engineering.
- specific competencies that are listed in the curricula of individual courses.

For the Master's degree programme Mechanical Engineering - Research and Development Programme the institution has presented the following profile in the self-assessment report

Primary 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 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 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 their successful continuation of studies in a doctoral degree programme (third-cycle studies).

The above-mentioned features enable graduates to master specialized fields within technical sciences, which enables them to become employable and successfully work in technical research and development departments of companies, in research laboratories of research institutes, in educational institutions, etc.

General competencies (learning outcomes)

- the ability to define, understand basic scientific problems and creatively solve professional challenges;
- expanding the ability to think critically, analytically and synthetically; development of new knowledge and understanding of the field; development of higher cognitive skills related to generating new knowledge;
- the ability to take responsibility for one's professional development and learning through evaluation and reflection on one's work (experiential learning, supervision);
- independent participation in various social activities and freelance work;
- the ability to communicate professionally in writing, including in an international arena;
- the ability to use information and communication technologies;
- the ability to apply the acquired knowledge to independently solve technical problems in mechanical engineering;
- the ability to search for resources, to critically evaluate information, to independently expand the acquired knowledge; and to broaden the knowledge of individual fields of mechanical engineering;
- the ability to work in groups and to network across disciplines; establishing partnerships with users and other groups; leadership and organizational skills;
- the ability to apply modern research methods and procedures; the ability to conduct research and transfer its findings into practice.

Subject-specific competencies (learning outcomes)

- the ability to expand and apply basic mechanical skills and their developmental
- mastery of basic theoretical as well as applied knowledge essential for the field of mechanical engineering;
- great proficiency in the field of mechanical engineering enabling continuation of studies in the doctoral programme;
- the capacity for physical, mathematical in numerical modelling of problems with a developed critical ability to critically analyse the results;
- the ability to independently acquire new knowledge and skills;
- the ability to independently perform demanding research, development, engineering and professional organizational work and the ability to creatively solve individual tasks in the field of mechanical engineering;
- the ability to find optimal solutions based on analysis and synthesis.

Peer Report for the ASIIN Seal[4]

1. The Degree Programme: Concept, content & implementation

Criterion 1.1 Objectives and learning outcomes of a degree programme (intended qualifications profile)

Evidence:

- Self-Assessment Reports
- Study plans of the degree programmes
- Module descriptions
- Webpage of all study programmes
- Discussions during the audit

Preliminary assessment and analysis of the peers:
The auditors base their assessment of the learning outcomes as provided on the websites and in the Self-Assessment Reports of the three Bachelor's degree programmes under review. They refer to the Subject-Specific Criteria (SSC) of the respective Technical Committee for Mechanical Engineering.

They take note that the faculty presents extensive sets of objectives and learning outcomes for all degree programmes to be assessed in this accreditation procedure (cf. Appendix). For each programme, the learning outcomes are divided into "general competences" and "course-specific competences". They are accessible to students, staff members and other stakeholders via links on the subject-specific pages of the faculty website to the Slovenian versions of the study programme information booklets. The websites as well as the English-language information booklets for all degree programmes quote those learning outcomes in translation.

Regarding the intended learning outcomes the auditors come to the following conclusions:

[4] This part of the report applies also for the assessment for the European subject-specific labels. After the conclusion of the procedure, the stated requirements and/or recommendations and the deadlines are equally valid for the ASIIN seal as well as for the sought subject-specific label.

Graduates of both bachelor programmes should gain extensive technical knowledge as to engineering, mathematics and natural science with a view to mechanical engineering and an understanding of the multi-disciplinary context of Engineering Sciences. In the formulated objectives of the university, the peers recognise that graduates should be qualified to identify, formulate and solve problems peculiar to mechanical mechatronic engineering, to analyse and assess products, processes and methods used in their discipline and to choose suitable methods of analysing, modelling, simulating and optimising and apply them. Additionally, the peers recognise that graduates should have the ability to conceive designs for machinery, devices, EDP programmes or processes and to develop them according corresponding to the status of their knowledge. Regarding transferable skills graduates should be able to work in teams, to communicate effectively and to be aware of the health, safety, legal issues and responsibilities of engineering practice and of the impact of engineering solutions in a social and environmental context. Finally, the auditors note that the university has also clearly identified the differences between the project-oriented and research-oriented programmes.

For the master programme, the reviewers recognise in the study objectives that graduates should get extensive advanced knowledge of mathematic-scientific and engineering principles of mechanical engineering as well as a critical awareness of the latest findings in their discipline. They should be able analyse and solve problems scientifically and to abstract and to formulate complex problems arising from a new or emerging field of their discipline. For solving problems they have the ability to apply innovative methods based on fundamentals and to develop new scientific methods. Regarding engineering design the auditors learn out of the study aims that graduates should develop concepts and solutions for fundamentally orientated and partially unusual problems under broad consideration of other discipline and be able to use their creativity to develop new and inventive products, processes and methods. In order to do so they are able to classify and systematically combine knowledge of different fields and handle complexity and to assess applicable methods.

For all programmes the auditors recognise that students should learn how to find and procure necessary information and how to assess them. Regarding transferable skills the university concentrates on communication skills and team working abilities of the students.

The auditors hold the view that the objectives and intended learning outcomes of both degree programmes under review are reasonable and well founded. They learn that various stakeholders (alumni, industrial representatives) are involved in the constant review and development of the curricula. For example, industrial representatives are regularly invited to give suggestions on the skills and expertise graduates must possess.

In summary, the auditors are convinced that the intended qualification profiles of both programmes under review allow students to take up an occupation, which corresponds to their qualification. This impression is confirmed in the respective discussions with business representatives described a high demand on the labour market for graduates with the intended qualifications.

The experts conclude that the objectives and intended learning outcomes of the degree programmes adequately reflect the intended level of academic qualification and correspond with the ASIIN Subject-Specific-Criteria (SSC) of the Technical Committee 01 – Mechanical Engineering and the EUR-ACE framework.

Criterion 1.2 Name of the degree programme

Evidence:

- Self-Assessment Report
- Discussions during the audit

Preliminary assessment and analysis of the peers:
The auditors confirm that the English translation and the original Slovenian names of the degree programmes under review correspond with the intended aims and learning outcomes..

Criterion 1.3 Curriculum

Evidence:

- Self-Assessment Reports
- Study plans of the degree programmes
- Module descriptions
- Webpages of all study programmes
- Discussions during the audit

Preliminary assessment and analysis of the peers:
Curriculum

The evaluators note a number of changes made by the university since the last accreditation due to the results of the various evaluations.

In both bachelor programmes a more flexible study structure has been introduced in order to facilitate the coordination of modern contents. Furthermore, the promotion of communication and social competences of students has been intesivied by increasing the number

of group work as representatives of industry mentioned especially this point in their feedbacks. Interdisciplinary aspects were intensified within the projects and students can also complete parts of the compulsory study content at other faculties. The faculty also balanced the student workload according to the number of ECTS credits in the courses regarding to the evaluation results.

In the master's degree programme, the elective options in particular have been expanded and time overlaps between courses have been eliminated.

The experts appreciate expressly the continuous development of the programmes based on the evaluation results.

In the current curriculum of the bachelor's degree programme mechanical engineering – project oriented apply programme students have to complete in the first year the compulsory courses Analysis, Technical Physics, Electrical Engineering and Electronics, Statics and strength of Materials, Metals, Technical Drawing, Ordinary differential equations and linear algebra, Technology in Production 1, Computer added Modelling, Thermofluidics, Non-Metal Materials, Dynamics and Engineering reporting.

In the second year students select one of the specialisations Energy Engineering, Process Engineering, Design of Machines and Devices, Design of Industrial Systems, Production Technologies, Production Engineering, Airline Transport Pilot, Aircraft Design and Maintenance or Mechatronics. While in the third semester all specialisation still have common compulsory courses (Mechatronics and Control Technology, Machine Elements 1, Production technology2, Maintenance, Heat and Mass Transfer, Programming Basics, Energy Machines and Measurement Practicum) in the fourth and fifth semester only specific courses for each specialisation are offered. Additionally the curriculum includes three general elective courses and three so called professional elective courses where students select compulsory courses out of the other specialisations. During the last semester students complete a project, a practical training and the thesis.

In the Bachelor's degree programme mechanical engineering – research and development programme no specialisations are included but in the first the compulsory courses Calculus and ordinary differential equations, Physics, Measurements in Mechanical Engineering, Statics and Kinematics, technical Drawing and Computer Added Modelling, Linear Algebra and Vector Analysis, Strength of Materials , Non-Metallic Materials, Thermodynamics, Metals, Electrical Engineering, Integral Transformations and Fourier Analysis, Rigid Body dynamics, Fluid statics and dynamics, Numerical Methods, Machine elements, Partial differential Equation, Complex Analysis, Production Technologies, Heat Transfer, Control Technology Engineering Design Methodology, Numerical Modelling, Tribology, Manufacturing technologies, Hydraulic and Pneumatics, Energy Machines, Data Processing, Mechatronics

and Laser Technologies. For an individual specialisation students have the opportunity to select six general elective courses. The thesis is written in the last semester.

In the master's degree programme no common compulsory courses are included. Students select from the beginning of the programme one of the specialisations Engineering Design, Mechanics, Energy Engineering, Process Engineering, Production Engineering, Mechatronics and Laser Technology with specific mandatory courses each. In all specialisations students select additionally up to six modules out of the compulsory modules of the other specialisations. In the last semester students complete a research project, a practicum and the master thesis.

The experts appreciate the overall structure of the study programme. While the project-oriented Bachelor's degree programme with its pronounced specialisations prepares students for a direct vocational career in the various subject areas of mechanical engineering, the research-oriented bachelor's degree programme teaches a wide range of mathematical and scientific and general engineering fundamentals with a simultaneous reference to mechanical engineering. This fundamentals are applied in depth in the specialisations of the master programme.

From the point of view of the auditors in all programmes the curricula implement all the defined study aims and learning outcomes. Out of the discussion with representatives of the industry they get the impression that graduates of the programmes are very well prepared for the labour market regarding their field specific competences.

The only critical point mentioned by the representatives of industry were the communication and team work ability of the graduates in the past. Therefore the auditors appreciate that the faculty already has implemented more group work and presentations in projects and lab exercises in the restructured programmes. In this context, however, they note that students receive hardly any guidance on how to carry out projects. Therefore they recommend to further enhance project management skills of the students.

With regard to the high dropout rate in the bachelor's degree programmes (see chapter 1.5) the auditors questioned the content of the first semester. Most courses are not directly related to mechanical engineering but deal with mathematical fundamentals and natural sciences. From their point of view it could be more motivating for students to also deal with mechanical engineering topics already at the beginning of their studies.

The first semester in particular has additionally a very high level of mathematical content. The analysis course alone is defined with 200 hours of student work (60 contact hours, 60 hours exercises and 80 hours self-studies). From the point of view of the auditors the con-

tent and requirements of this course should not be reduced but it could be helpful for students to split up the course over two semesters. Probably it would be easier for students to learn the content and would facilitate the transition from school to university.

In view of the very wide range of options the experts appreciate the established advisory system to support students selecting specialisations and elective courses.

For the further development of the programmes the study commission meets once a year with representatives of industry. Currently the faculty is in an internal discussion how to adapted the fundamentals to the new field specific content, which means the remaining vertical structure is effected by the new horizontal structure (different needs in mathematics, natural science and engineering fundamentals).

Overall, the auditors come to the conclusion that the curricula of all programmes implement the intended learning outcomes in a very good manner. From their point of view the curricula are linked to the actual field specific research discussions and students are well prepared for the mentioned activities in the labour market.

Structure

The structure of the programmes under review is clearly outlined on the subject specific website for each study programme. The programmes consist of courses/modules, which comprise a sum of teaching and learning. Based on the analysis of the sequence of modules and the respective module descriptions the auditors concluded that the structure of all programmes ensures that the learning outcomes can be reached.

The programmes also offer elective courses, which allows students to define an individual focus. The number of elective courses allows students sufficient choices. Students expressed great satisfaction with the courses to the auditors. Although the number of students in the single specialisations is limited and students have to rank their wishes for specialization they regularly get access to one of their first three intended specialization. Thus students see no problems in the limitation of participants.

Mobility

Regarding student mobility, international exchange is supported both by the university and the faculty. The office for international affairs of the university concludes cooperation agreements with universities abroad at the university level and offers exchange programs for university students as part of the cooperation. Usually there is an agreement between the partner universities on the recognition of courses and accumulated credit points.

In order to facilitate close international cooperation, the Faculty of Mechanical Engineering offers in its bachelor programmes 24 courses taught in English exclusively for foreign students (parallel lectures). In the master programme 36 courses are conducted in English. In 2021/22 some 100 incoming students visited classes at the faculty while only 31 students fo the faculty studied abroad and other four students completed an international internship.

Out of the discussion with students the auditors learned that the faculty encourage master students to study abroad and participating in research projects. On the other hand lecturers discourage bachelor students to visit another university.

In summary the auditors see a well-structured system to support students studying abroad, but they recommend not to limit it to master students but to encourage bachelor students as well to study abroad,

Criterion 1.4 Admission requirements

Evidence:

- Self-Assessment Report
- Academic Guidelines
- Information booklets of the study programmes
- Enrolment Guides
- Websites
- Discussions during the audit

Preliminary assessment and analysis of the peers:
The admission criteria for the bachelor's degree programmes base generally on results during high school and the university established a point system to rank applicants. Within the point system the overall score of the high school exam counts 30% and the last two years at high school another 30%. Furthermore, grades in physics and mathematics are taken into account with 20% each. For applicants from technical or vocational schools the university defined additional selection criteria.

The auditors learn that the admission was limited in former times by a numerus clausus but as the number of applicants decrease in the last years the university carries out promotional activities at schools, especially for girls.

For the master programme the faculty requires a first-cycle study programme comprising at least 180 ECTS-points in the field of Mechanical Engineering (with research and development content), or an equivalent study programme.

Graduates from project oriented programmes have to complete the study requirements necessary for the continuation of studies in the amount of 10 to 15 ECTS credits before enrolment. The auditors understand that these additional requirements refer to mathematical knowledge as in the research oriented bachelor programme mathematics is dealt much more intensive.

Most of the master students graduate in the own bachelor programmes of the faculty. Around 25% of the graduates out of the project oriented bachelor applied for the master programme in the past. However, the university expects a decrease of this number as in the restructured bachelor programme the mathematical content is even reduced compared to the former curriculum.

In summary the auditors acknowledge that the admission requirements and selection criteria are transparently displayed on the subject-specific pages of the faculty website. The rules and procedures are binding. The admission requirements are structured in a way that supports the students in achieving the learning outcomes.

Criterion 1.5 Workload and Credits

Evidence:

- Self-Assessment Report
- Study plans of the degree programmes
- Module descriptions
- Discussions with programme coordinators, teaching staff and students

Preliminary assessment and analysis of the peers:
The faculty makes use of the ECTS credit point system and allocates ECTS credits to the modules according to an estimated workload that is required from an average student for the successful completion of the course. The workload comprises both attendance-based learning and self-study. The course descriptions inform about how the workload is divided into the time spent on contact lessons and the time for individual work. The university calculates 25 hours of student work per ECTS-point. All mandatory parts of the degree programmes, including practical training and Master's thesis, are awarded with credits.

From the point of view of the auditors the workload defined for the single modules seems to be realistic comparing it with the objectives and the content of the courses. This impression is confirmed by the evaluation results and during the discussions by the students.

Nevertheless, the experts question the reasons why a comparable high number of students leave the bachelor programmes before graduation and why those graduating need in aver-

age much more time to finish their studies than foreseen. Out of the discussion with students and teaching staff they learned that the dropout of nearly 50% of starting students in the first is due to the requirements in mathematics. Especially those students coming from technical school have problems with mathematics due to their pre-knowledge although the faculty offers summer trainings before the semester starts and tutorials during the semester.

Around 10% of the students do not take part in the exams in the first year. These students are asked by the faculty regularly and the most common reason named by students is the difficulty of the mathematics classes. However, comprehensible for the auditors, the university will not low their standards in order to ensure that students get the mathematical background for the courses in higher semesters. Out of the inspection of the exams, they assess the requirements in mathematics indeed as really high, but not excessive for bachelor programmes. Additionally, a certain percentage of students seems to be enrolled only for student benefits.

With regard to the frequent exceeding of the standard period of study, teachers and students agree that the causes lie almost exclusively in the private sphere. The students confirm that there are no structural problems given in the programmes and that the workload would allow to finish in time.

The experts conclude that the long study durations and the high dropout rate are therefore predominantly not due to causes for which the university is responsible.

Criterion 1.6 Didactic and Teaching Methodology

Evidence:

- Self-Assessment Reports
- Study plans of the degree programmes
- Module descriptions
- Discussions during the audit

Preliminary assessment and analysis of the peers:
Various teaching and learning methods (including lectures, computer training, classroom and lab exercises, individual and group assignments, seminars and projects) have been implemented. Structured activities include tutorials, homework, assignments and practical activities.

During the covid pandemic new equipment for online teaching was acquired by the university. This equipment is in use after the end of the pandemic as well. Via online platforms students have access to all needed learning materials, classroom moodle is used for communication by most of the lecturers and lectures are recorded in order to allow students to repeat the class at home.

In the interdisciplinary project students have to work on tasks created with relation to different specialisations in the programmes. It is conducted in groups and students can cooperate with members of other projects.

The auditors highlighted the so called open labs. In these labs students provide projects for other students without professors, lecturers or companies being involved. Only certain requirements for the projects and rules for conducting them are given by the faculty. The best projects take part in a yearly competition with other universities worldwide. This introduces students to research and motivates them to carry out their own research activities. In addition, they gain great experience in self-organisation, project management and working in interdisciplinary teams.

During regular lab exercises students work in groups and also are involved in research projects, even in international project in which they have to work with international students.

The auditors appreciate that the faculty has established a pronounced system of student oriented teaching and learning.

In summary, the peer group considers the teaching methods and instruments to be suitable to support the students in achieving the intended learning outcomes. In addition, they confirm that the study concept of all three programmes comprises a variety of teaching and learning forms as well as practical parts that are adapted to the respective subject culture and study format. To them, the programmes seem to be well-balanced between attendance-based learning and self-study, and there is evidence that the research oriented programmes offer students the opportunity to develop skills in scientific research.

2. Exams: System, Concept and Organisation

Criterion 2 Exams: System, concept and organisation

Evidence:

- Self-Assessment Report
- Module descriptions
- Examination regulations

- Information booklets for all degree programmes
- Samples of student's work (projects, exams and theses)
- Websites
- Discussions during the audit

Preliminary assessment and analysis of the peers:
The auditors note that all examinations of the degree programmes under review follow the examination regulations of the university and that according to the students all the exams are conducted with principle of fairness, relevance and accountability. There are different types of examination methods in use including written exams, laboratory work, project work and presentations. The type of assessment or the combination of several methods are designed based on the intended learning outcomes of each course to evaluate the knowledge, skills and competences of the students properly and are visible in the module descriptions.

Students get five attempts to pass an exam in each individual course. Exams are offered three times in a year. Students may repeat failed exams in each period. They are not forced to repeat a failed exam in the next examination period but are free to schedule it as they like.

Most of the courses in all degree programmes includes mid-term exams and final exams ('colloquiums'). The structure of these exams is defined by the lecturer of the course. In case final theses are conducted in industry a professor and a representative of the company assess them. The grade is the average between both assessments.

To go into the second and third year students need a certain number of ECTS-Points. The required ECTS-points are from the students' point of view only challenging for those who are engaged in other activities beside the study.

The selection of exams and Master's theses that were presented to the auditors gives them the impression of an adequate level of the tasks and demonstrates good performances of the students. They are overall satisfied with the general quality of the samples. The experts conclude that the criteria regarding the examinations system, concept, and organization are fulfilled and that the examinations are suitable to verify whether the intended learning outcomes are achieved.

3. Resources

Criterion 3.1 Staff and Development

Evidence:

- Self Assessment Report
- Staff handbook
- Discussions with programme coordinators and teaching staff

Preliminary assessment and analysis of the peers:

At University of Ljubljana the staff members have different academic positions. There are professors, associate professors, assistant professors and lecturers. The academic position of each staff member is based on research activities, publications, academic education, supervision of students, and other supporting activities. The Faculty of Mechanical Engineering is composed of 21 professors (including 16 chairs, responsible for the organisation of the institutes of the faculty), 16 associated professors and 9 assistant professors. Additionally 82 assistants, mostly already reached PhD, are paid out of public funds of the faculty and some 200 so called researchers are paid out of research projects preparing their PhD. Additionally the faculty employs 49 technical staff members.

The experts are impressed by the diverse research activities of the faculty which are concentrated on the main field of Green mobility, Factory of the future, Health and Sustainable Energy. Out of third party funding (public and industrial sector) the faculty gets nearly 20 Mio Euro per year. Four research clusters are established to support the organisation of interdisciplinary research projects at the faculty. The teaching staff is satisfied with the support of its research activities by faculty and university. The main issue is not to finance projects but to find employees for the project work as graduates prefer to go into industry due to the salary. Visitations of international conferences are paid out of projects and only a little fund is given by the faculty. Sabbaticals are possible as well but seldom for a whole semester.

The auditors confirm that the teaching staff covers all core content of mechanical engineering adequately. They are impressed by the extended research activities of the teaching staff. They highlight especially the number of research projects. The auditors got the impression that the teaching staff and the faculty in total is very well involved in national and international research activities and academic networks.

For the development of the teaching staff the faculty offers regular formal and informal training in postgraduate study education and pedagogic education as well as various short seminars (e.g. a use of information and communication technology seminar). The faculty is monitoring the attendance in these courses. The development of the employees in this field is guided by their supervisor, usually the head of the respective chair or laboratory.

In summary, the peers are convinced that the faculty provides sufficient support mechanisms and opportunities for members of the teaching staff to develop their personal skills. They learn that the teachers are satisfied with the internal qualification programme at the university and their opportunities to further improve their didactic abilities.

Criterion 3.2 Student Support and Student Services

Evidence:

- Self-Assessment Report
- Information booklets for all degree programmes
- International student's guidebook
- Discussions during the audit

Preliminary assessment and analysis of the peers:
The auditors recognise numerous offers providing services and information about the study programmes and the execution of the study process. Personal consultation for students is mainly available at the Student Office but also at the University Career Centre and the International Office. The Career Centre offers students presentations of work environments, networking and "speed dates" with employers organised by the Student Council, career days and workshops for acquiring competencies.

For the accompaniment of the teaching process, the faculty has established a system of mentoring and tutoring. Mentors are selected among the teaching staff, one for each study year of the three degree programmes respectively. The tutoring system is defined in corresponding written regulations.

The student evaluation survey contains a section dealing with the general performance of the faculty and includes questions on the provision of information at the faculty and on counselling. Moreover, students can express their opinions and comments at the Class Councils, and representatives of the student council also participate in the Study Commission of the faculty and other decision taking institutions.

As the university pursues a policy to provide equal opportunities to students with special needs and with disabilities, it offers possibilities for adjustments to enable such students to enrol in its study programmes. The adjustment measures cover the organisation of exams (extended time, breaks, conducting of oral exams in written form or vice versa), the laboratory work (special space and access to machines, individual approach, contextual adjustments), and the relaxation of deadlines for the execution of compulsory assignments, seminar papers, and other study obligations.

The peers thus acknowledge that sufficient resources are available to provide individual assistance, advice and support for all students, and that the allocated advice and guidance assist the students in achieving the learning outcomes and in completing the courses successfully. Overall, the peers judge the extensive support system to be one of the strong points of the University of Ljubljana and one of the reasons for the high satisfaction of the students.

Criterion 3.3 Funds and equipment

Evidence:

- Self-Assessment Report
- Discussions during the audit
- Visitation of the institution

Preliminary assessment and analysis of the peers:
As described in the Self-Assessment Report the faculty is funded from three sources: governmental funding for the execution of the pedagogical activity as its basic mission, governmental and partly EU funding within public research programmes for the execution of scientific research activities, and funding from business partners for activities in the field of commercial activity. The figures presented by the university show that the faculty's income is stable and the funding of the degree programmes is secured. The academic staff emphasise that from their point of view, the three degree programmes under review receive sufficient funding for teaching and learning activities.

During the audit, auditors visit laboratories, the lecture rooms and the library. They notice that the lecture rooms are in a good condition and equipped with modern technology. The faculty under review has well equipped teaching as well as research laboratories for the three degree programmes. Overall, they notice that there are no bottlenecks due to missing equipment. The technical equipment for teaching the students on a Master's level as well as advanced instruments for conducting research activities are available. The students confirm this positive impression during the discussion with the experts and state their satisfaction with the available resources.

The main issue for the faculty is space. Already during the last accreditation a new building was announced which is still in planning stage. Therefore there are only few student workplaces available and lab experiments are limited due to the space. The faculty expected the new building with much more space available within the next years.

In summary, the panel judges the available funds, the technical equipment, (laboratories, library, seminar rooms etc.) to comply with the requirements for adequately sustaining the degree programmes.

4. Transparency and documentation

Criterion 4.1 Module descriptions

Evidence:

- Self-Assessment Report
- Module descriptions

Preliminary assessment and analysis of the peers:
The students, as all other stakeholders, have access to the module descriptions via universities homepage.

The auditors confirm that the module descriptions include all necessary information about the persons responsible for each module, the teaching methods and work load, the awarded credit points, the intended learning outcomes, the content, the applicability, the admission and examination requirements, and the forms of assessment and details explaining how the final grade is calculated. In addition, the peers appreciate the fact that the module descriptions are available in a bilingual version (Slovenian and English).

Criterion 4.2 Diploma and Diploma Supplement

Evidence:
Self-Assessment Reports

Sample Diploma for each degree programme

Sample Diploma Supplement for each degree programme

Preliminary assessment and analysis of the peers:
The auditors confirm that the students of all degree programmes under review are awarded a Diploma and a Diploma Supplement after graduation. The diploma supplement contains detailed information about the educational objectives, learning outcomes as well as about the educational system and statistical data according to the ECTS-Users‘ guide in addition to the final grade.

Criterion 4.3 Relevant rules

Evidence:

- Self-Assessment Reports
- All relevant regulations as published on the university's webpage

Preliminary assessment and analysis of the peers:
The auditors confirm that the rights and duties of both university and the students are clearly defined and binding. All rules and regulations are published on the university's website and hence available to all stakeholders. In addition, the students receive all relevant course material in the language of the degree programme at the beginning of each semester.

5. Quality management: quality assessment and development

Criterion 5 Quality management: quality assessment and development

Evidence:

- Self-Assessment Report
- Academic Guidelines
- Samples of surveys
- Discussions during the audit

Preliminary assessment and analysis of the peers:
The auditors find an institutional system of quality management aiming at continuously improving the degree programmes. In the Self-Assessment Report, the faculty explains how the quality assessment for the study programmes functions as a part of the faculty's quality management system as a whole. The basic approach represents a four-stage management method, which includes planning, implementation of planned measures, monitoring and checking the adequacy of implementation, and action based on the experience gained from implementation ("PCDA").

The quality management systems is based on data collected out of several internal assessment mechanism and the student evaluation. Each programme prepare a self-assessment report which is discussed in the study commission and the faculty creates an annual report for the head of the university. Student evaluations are conducted shortly before and after exam for each course in each semester. The Student Council which is represented in the study commission inform students throughout the year about decisions, strategies and activities of the faculty management and collect suggestions from students for improvement. The Student

council also inform students about the results of the student evaluation by writing a comment on the results which is available for all students.

During the discussion with the students were very satisfied with the evaluations systems as they see continuously changes out of their evaluations.

The peers are impressed by the elaborated quality management system developed by the faculty that covers both the quality assurance for the study programmes and the quality assurance for the faculty as a whole including all services supporting the educational objectives. They confirm that responsibilities and mechanisms are defined and binding, the outcomes and measures are made known to anyone involved, and that the students participate in the quality assurance process not only by surveys but also by representation in the relevant bodies. However the auditors mention one point to optimise the quality assurance system. In order to include the students even more into the process they recommended to discuss the evaluation results of the single courses with those students involved.

Additional Documents

„No additional documents needed“

Summary: Peer recommendations

The peers recommend the award of the seals as follows:

Degree Programme	ASIIN-seal	Maximum duration of accreditaiton	Subject-specific label
Ba Mechanical Engineering - Project Oriented Applied Programme	Without requirements	30.09.2031	EUR-ACE (Depending on the decision of the ENAEE Administrative Council)
Ba Mechanical Engineering – Research and Development Programme	Without requirements	30.09.2031	EUR-ACE (Depending on the decision of the ENAEE Administrative Council)

Degree Programme	ASIIN-seal	Maximum duration of accreditaiton	Subject-specific label
Ma Mechanical Engineering – Research and Development Programme	Without requirements	30.09.2031	EUR-ACE (Depending on the decision of the ENAEE Administrative Council)

Recommendations

For all degree programmes

E 1. (ASIIN 1.3) It is recommended to further enhance project management skills. The concept of the European Global Development project might be taken as good practice.

E 2. (ASIIN 1.6) It is recommended to encourage students more intensively to study abroad and to offer more opportunities to train English skills.

E 3. (ASIIN 5) It is recommended also to discuss the results of the teaching evaluations with the students.

Comment of the Technical Committee

The Technical Committee discusses the procedure and follows the assessment of the auditors without any changes.

The Technical Committee 01 – Mechanical Engineering/Process Engineering recommends the award of the seals as follows:

Degree Programme	ASIIN-seal	Maximum duration of accreditaiton	Subject-specific label
Ba Mechanical Engineering - Project Oriented Applied Programme	Without requirements	30.09.2031	EUR-ACE (Depending on the decision of the ENAEE Administrative Council)

Degree Programme	ASIIN-seal	Maximum duration of accreditaiton	Subject-specific label
Ba Mechanical Engineering – Research and Development Programme	Without requirements	30.09.2031	EUR-ACE (Depending on the decision of the ENAEE Administrative Council)
Ma Mechanical Engineering – Research and Development Programme	Without requirements	30.09.2031	EUR-ACE (Depending on the decision of the ENAEE Administrative Council)

Decision of the Accreditation Commission

The Accreditation Commission discusses the procedure and follows the assessment of the auditors without any changes.

The Accreditation Commission decides to award the following seals:

Degree Programme	ASIIN-seal	Maximum duration of accreditaiton	Subject-specific label
Ba Mechanical Engineering - Project Oriented Applied Programme	Without requirements	30.09.2031	EUR-ACE (Depending on the decision of the ENAEE Administrative Council)
Ba Mechanical Engineering – Research and Development Programme	Without requirements	30.09.2031	EUR-ACE (Depending on the decision of the ENAEE Administrative Council)
Ma Mechanical Engineering – Research and Development Programme	Without requirements	30.09.2031	EUR-ACE (Depending on the decision of the ENAEE Administrative Council)

Recommendations

For all degree programmes

E 1. (ASIIN 1.3) It is recommended to further enhance project management skills. The concept of the European Global Development project might be taken as good practice.

E 2. (ASIIN 1.6) It is recommended to encourage students more intensively to study abroad and to offer more opportunities to train English skills.

E 3. (ASIIN 5) It is recommended also to discuss the results of the teaching evaluations with the students.

Appendix: Programme Learning Outcomes and Curricula

The following **curriculum** is presented for the bachelor's degree programme mechanical engineering - Project Oriented Applied Programme:

Year 1

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0562656	Analysis - PAP	Aljoša Peperko, Boštjan Gabrovšek, Janez Žerovnik	60		60			80	200	8	Winter	no
2.	0562657	Technical physics	Rok Petkovšek	45		45			35	125	5	Winter	no
3.	0562658	Electrical engineering and electronics	Marjan Jenko	30		30			40	100	4	Winter	no
4.	0562659	Metals - PAP	Roman Šturm	30		30			40	100	4	Winter	no
5.	0562660	Statics and strength of materials	Miroslav Halilovič	45		45			35	125	5	Winter	no
6.	0562661	Technical drawing	Andrej Žerovnik, Robert Kunc	30		30			40	100	4	Winter	no
7.	0562662	Ordinary differential equations and linear algebra - PAP	Aljoša Peperko, Boštjan Gabrovšek, Janez Žerovnik	45		45			35	125	5	Summer	no
8.	0562663	Technologies in production 1	Franci Pušavec, Joško Valentinčič	45		45			35	125	5	Summer	no
9.	0562664	Computer aided modelling of geometry	Leon Kos, Nikola Vukašinović	30		30			40	100	4	Summer	no
10.	0562665	Thermofluidics	Andrej Bombač, Božidar Šarler	45		45			35	125	5	Summer	no

11.	0562666	Non-metallic materials - PAP	Lidija Slemenik Perše	30		30			40	100	4	Summer	no
12.	0562667	General elective subject 1 1		15		15			45	75	3	Summer	yes
13.	0562709	Dynamics	Janko Slavič, Martin Česnik	30		30			40	100	4	Summer	no
		Total		480	0	480	0	0	540	1500	60		

Year 1, General elective subject 1

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0562710	Engineering re-porting - PAP	Miha Brojan / Franc Majdič / Rok Vrabič / Nikola Vukašinović	15		15			45	75	3	Summer	yes
		Total		15	0	15	0	0	45	75	3		

General elective subject 1 amounting to 3 ECTS is chosen by the student at his/her own choice in any programme, faculty or university. Elective course offered by FME: Poročanje vstrojništvu - PAP.

Energy Engineering (field of study)

Year 2

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0562711	Mechatronics and control technology	Janez Diaci	30		30			40	100	4	Winter	no
2.	0562712	Machine elements 1 - pap	Jernej Klemenc, Marko Nagode	45		45			35	125	5	Winter	no

3.	0562713	Engineering Design Methodology - PAP	Janez Benedičič, Roman Žavbi	30		30			40	100	4	Winter	no
4.	0562714	Production technologies 2	Damjan Klobčar, Tomaž Pepelnjak	45		45			35	125	5	Winter	no
5.	0562715	Maintenance	Franc Majdič, Marko Polajnar, Mitjan Kalin	30		30			40	100	4	Winter	no
6.	0562716	Heat and mass transfer	Andrej Kitanovski	30		30			40	100	4	Winter	no
7.	0562717	Programming basics	Miroslav Halilovič, Nikolaj Mole / Bojan Starman	30		30			40	100	4	Winter	no
8.	0562718	Energy machines and appliances - pap	Mihael Sekavčnik	30		30			65	125	5	Summer	no
9.	0562719	Measurement practicum	Jože Kutin	30		30			65	125	5	Summer	no
10.	0562720	Introduction to acoustics	Jurij Prezelj	30		30			40	100	4	Summer	no
11.	0562721	Thermal and nuclear power systems	Andrej Senegačnik	30		30			40	100	4	Summer	no
12.	0562722	Experimental methods in energy engineering	Jože Kutin, Marko Hočevar	30		30			40	100	4	Summer	no
13.	0562723	Professional elective subject S01		30		30			40	100	4	Summer	yes
14.	0562724	Elective subject 01		30		30			40	100	4	Summer	yes
		Total		450	0	450	0	0	600	1500	60		

The professional elective subject S01 for 4 ECTS is chosen by the student at his/her own choice from the set of all compulsory subjects of other subjects of the Higher Professional Study Programme Mechanical Engineering - Project Oriented Applied Programme of 1st cycle except for Energy Engineering.

The elective subject 01 for 4 ECTS is chosen by the student at his/her own choice from the set of all compulsory subjects of other subjects of the Higher Professional Study Programme Mechanical Engineering - Project Oriented Applied Programme of 1st cycle except for Energy Engineering or at his/her own choice in any programme, faculty or university.

Year 3

	Contact hours	

	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0562725	Hydro and wind energy systems	Marko Hočevar	30		30			40	100	4	Winter	no
2.	0562726	Internal combustion engines and electromobility	Tomaž Katrašnik	30		30			40	100	4	Winter	no
3.	0562727	Sustainable energy technologies	Mihael Sekavčnik, Mitja Mori	30		30			40	100	4	Winter	no
4.	0562728	Systems for compressed gases and vacuum	Jurij Prezelj	30		30			40	100	4	Winter	no
5.	0562729	General elective subject 2		15		15			45	75	3	Winter	yes
6.	0562730	General elective subject 3		15		15			45	75	3	Winter	yes
7.	0562731	Professional elective subject S02		30		30			40	100	4	Winter	yes
8.	0562732	Professional elective subject S03		30		30			40	100	4	Winter	yes

9.	0562733	Development processes in Mechanical Engineering	Aljoša Peperko, 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 Diaci, Janez Kušar, Janez Žerovnik, Janko Slavič, Jernej Klemenc, Joško Valentinčič, Jože Kutin, Jurij Prezelj, Lidija Slemenik Perše , Marko Hočevar, Marko Nagode, Matija Jezeršek, Miha Boltežar, Miha Brojan, Mihael Sekavčnik, Miroslav Halilovič, Mitjan Kalin, Niko Herakovič, Nikolaj Mole, Primož Podržaj, Robert Kunc, Rok Petkovšek, Rok Vrabič, Roman Šturm, Roman Žavbi, Sašo Medved, Tadej Kosel, Tomaž Katrašnik, Tomaž Pepelnjak, Uroš Stritih	90		90			120	300	12	Summer	no
10.	0562734	Practical training	All heads in the programme	5					195	200	8	Summer	no
11.	0562735	Diploma thesis	All heads in the programme		35			70	145	250	10	Summer	no
		Total		305	35	300	0	70	790	1500	60		

Professional elective subjects S02 and S03 for 8 ECTS is chosen by the student at his/her own choice from the set of all compulsory subjects of other subjects of the Higher Professional Study Programme Mechanical Engineering - Project Oriented Applied Programme of 1st cycle except for Energy Engineering.

Process engineering (field of study)

Year 2

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0562711	Mechatronics and control technology	Janez Diaci	30		30			40	100	4	Winter	no
2.	0562712	Machine elements 1 - PAP	Jernej Klemenc, Marko Nagode	45		45			35	125	5	Winter	no
3.	0562713	Engineering Design Methodology - PAP	Janez Benedičič, Roman Žavbi	30		30			40	100	4	Winter	no
4.	0562714	Production technologies 2	Damjan Klobčar, Tomaž Pepelnjak	45		45			35	125	5	Winter	no
5.	0562715	Maintenance	Franc Majdič, Marko Polajnar, Mitjan Kalin	30		30			40	100	4	Winter	no
6.	0562716	Heat and mass transfer	Andrej Kitanovski	30		30			40	100	4	Winter	no
7.	0562717	Programming basics	Miroslav Halilovič, Nikolaj Mole	30		30			40	100	4	Winter	no
8.	0562718	Energy machines and appliances - PAP	Mihael Sekavčnik	30		30			65	125	5	Summer	no
9.	0562719	Measurement practicum	Jože Kutin	30		30			65	125	5	Summer	no
10.	0563382	Process systems	Iztok Golobič	30		30			40	100	4	Summer	no
11.	0563383	Refrigeration and heat pumps - PAP	Andrej Kitanovski	30		30			40	100	4	Summer	no
12.	0563384	Building physics and indoor environment quality	Sašo Medved, Uroš Stritih	30		30			40	100	4	Summer	no
13.	0562723	Professional elective subject S01		30		30			40	100	4	Summer	yes
14.	0562724	Elective subject 01		30		30			40	100	4	Summer	yes
		Total		450	0	450	0	0	600	1500	60		

The professional elective subject S01 for 4 ECTS is chosen by the student at his/her own choice from the set of all compulsory subjects of other subjects of the Higher Professional Study Programme Mechanical Engineering - Project Oriented Applied Programme of 1st cycle except for Process Mechanical Engineering.

The elective subject 01 for 4 ECTS is chosen by the student at his/her own choice from the set of all compulsory subjects of other subjects of the Higher Professional Study Programme Mechanical Engineering - Project Oriented Applied Programme of 1st cycle except for Process Mechanical Engineering or at his/her own choice in any programme, faculty or university.

Year 3

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0563387	Community-integrated energy systems	Andrej Kitanovski, Sašo Medved	30		30			40	100	4	Winter	no
2.	0563388	Water environmen-tal process engineering	Iztok Golobič, Uroš Stritih	30		30			40	100	4	Winter	no
3.	0563389	Heating, refrig-eration, ventila-tion, air- condi-tioning - PAP	Uroš Stritih	30		30			40	100	4	Winter	no
4.	0577731	Solar energy engineering	Andrej Kitanovski, Sašo Medved	30		30			40	100	4	Winter	no
5.	0562729	General elective subject 2		15		15			45	75	3	Winter	yes
6.	0562730	General elective subject 3		15		15			45	75	3	Winter	yes
7.	0562731	Professional elective subject S02		30		30			40	100	4	Winter	yes

8.	0562732	Professional elective subject S03		30		30			40	100	4	Winter	yes
9.	0562733	Development processes in Mechanical Engineering	Aljoša Peperko, 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	90		90			120	300	12	Summer	no
			Diaci, Janez Kušar, Janez Žerovnik, Janko Slavič, Jernej Klemenc, Joško Valentinčič, Jože Kutin, Jurij Prezelj, Lidija Slemenik Perše , Marko Hočevar, Marko Nagode, Matija Jezeršek, Miha Boltežar, Miha Brojan, Mihael Sekavčnik, Miroslav Halilovič, Mitjan Kalin, Niko Herakovič, Nikolaj Mole, Primož Podržaj, Robert Kunc, Rok Petkovšek, Rok Vrabič, Roman Šturm, Roman Žavbi, Sašo Medved, Tadej Kosel, Tomaž Katrašnik, Tomaž Pepelnjak, Uroš Stritih										
10.	0562734	Practical training	All heads in the programme	5					195	200	8	Summer	no
11.	0562735	Diploma thesis	All heads in the programme		35			70	145	250	10	Summer	no
		Total		305	35	300	0	70	790	1500	60		

Professional elective subjects S02 and S03 for 8 ECTS is chosen by the student at his/her own choice from the set of all compulsory subjects of other subjects of the Higher Professional Study Program Mechanical Engineering - Project Oriented Applied Programme of 1st cycle except for Process Mechanical Engineering.

Design of machines and devices (field of study)

Year 2

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0562711	Mechatronics and control technology	Janez Diaci	30		30			40	100	4	Winter	no
2.	0562712	Machine elements 1 - PAP	Jernej Klemenc, Marko Nagode	45		45			35	125	5	Winter	no
3.	0562713	Engineering Design Methodology - PAP	Janez Benedičič, Roman Žavbi	30		30			40	100	4	Winter	no
4.	0562714	Production technologies 2	Damjan Klobčar, Tomaž Pepelnjak	45		45			35	125	5	Winter	no
5.	0562715	Maintenance	Franc Majdič, Marko Polajnar, Mitjan Kalin	30		30			40	100	4	Winter	no
6.	0562716	Heat and mass transfer	Andrej Kitanovski	30		30			40	100	4	Winter	no
7.	0562717	Programming basics	Miroslav Halilovič, Nikolaj Mole	30		30			40	100	4	Winter	no
8.	0562718	Energy machines and appliances - PAP	Mihael Sekavčnik	30		30			65	125	5	Summer	no
9.	0562719	Measurement practicum	Jože Kutin	30		30			65	125	5	Summer	no
10.	0563423	Machine elements 2 - PAP	Jernej Klemenc, Marko Nagode	30		30			40	100	4	Summer	no
11.	0563424	Lubricants and lubrication	Mitjan Kalin	30		30			40	100	4	Summer	no
12.	0563425	Fundamentals of FEM analysis	Miroslav Halilovič, Nikolaj Mole	30		30			40	100	4	Summer	no
13.	0562723	Professional elective subject S01		30		30			40	100	4	Summer	yes

14.	0562724	Elective subject 01		30		30			40	100	4	Summer	yes
		Total		450	0	450	0	0	600	1500	60		

The professional elective subject S01 for 4 ECTS is chosen by the student at his/her own choice from the set of all compulsory subjects of other subjects of the Higher Professional Study Program Mechanical Engineering - Project Oriented Applied Programme of 1st cycle except for Design of machines and devices.

The elective subject 01 for 4 ECTS is chosen by the student at his/her own choice from the set of all compulsory subjects of other subjects of the Higher Professional Study Program Mechanical Engineering - Project Oriented Applied Programme of 1st cycle except for Design of machines and devices or at his/her own choice in any programme, faculty or university.

Year 3

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0563428	Dimensioning and norms	Boris Jerman, Jernej Klemenc	30		30			40	100	4	Winter	no
2.	0563429	Fatigue design	Domen Šeruga, Jernej Klemenc, Marko Nagode	30		30			40	100	4	Winter	no
3.	0563430	Hydraulics and pneumatics - PAP	Franc Majdič	30		30			40	100	4	Winter	no
4.	0563431	Mechanisms analysis and synthesis	Robert Kunc, Samo Zupan	30		30			40	100	4	Winter	no
5.	0562729	General elective subject 2		15		15			45	75	3	Winter	yes
6.	0562730	General elective subject 3		15		15			45	75	3	Winter	yes
7.	0562731	Professional elective subject S02		30		30			40	100	4	Winter	yes
8.	0562732	Professional elective subject S03		30		30			40	100	4	Winter	yes

9.	0562733	Development processes in Mechanical Engineering	Aljoša Peperko, 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 Diaci, Janez Kušar, Janez Žerovnik, Janko Slavič, Jernej Klemenc, Joško Valentinčič, Jože Kutin, Jurij Prezelj, Lidija Slemenik Perše , Marko Hočevar, Marko Nagode, Matija Jezeršek, Miha Boltežar, Miha Brojan, Mihael Sekavčnik, Miroslav Halilovič, Mitjan Kalin, Niko Herakovič, Nikolaj Mole, Primož Podržaj, Robert Kunc, Rok Petkovšek, Rok Vrabič, Roman Šturm, Roman Žavbi, Sašo Medved, Tadej Kosel, Tomaž Katrašnik, Tomaž Pepelnjak, Uroš Stritih	90		90			120	300	12	Summer	no
10.	0562734	Practical training	All heads in the programme	5					195	200	8	Summer	no
11.	0562735	Diploma thesis	All heads in the programme		35			70	145	250	10	Summer	no
		Total		305	35	300	0	70	790	1500	60		

Professional elective subjects S02 and S03 for 8 ECTS is chosen by the student at his/her own choice from the set of all compulsory subjects of other subjects of the Higher Professional Study Program Mechanical Engineering - Project Oriented Applied Programme of 1st cycle except for Design of machines and devices.

Design of industrial systems (field of study)

Year 2

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0562711	Mechatronics and control technology	Janez Diaci	30		30			40	100	4	Winter	no
2.	0562712	Machine elements 1 - PAP	Jernej Klemenc, Marko Nagode	45		45			35	125	5	Winter	no
3.	0562713	Engineering Design Methodology - PAP	Janez Benedičič, Roman Žavbi	30		30			40	100	4	Winter	no
4.	0562714	Production technologies 2	Damjan Klobčar, Tomaž Pepelnjak	45		45			35	125	5	Winter	no
5.	0562715	Maintenance	Franc Majdič, Marko Polajnar, Mitjan Kalin	30		30			40	100	4	Winter	no
6.	0562716	Heat and mass transfer	Andrej Kitanovski	30		30			40	100	4	Winter	no
7.	0562717	Programming basics	Miroslav Halilo-vič, Nikolaj Mole	30		30			40	100	4	Winter	no
8.	0562718	Energy machines and appliances - PAP	Mihael Sekavčnik	30		30			65	125	5	Summer	no
9.	0562719	Measurement practicum	Jože Kutin	30		30			65	125	5	Summer	no
10.	0577805	Documentation and document management system	Robert Kunc, Samo Zupan	30		30			40	100	4	Summer	no
11.	0563465	Material handling equipment and systems	Boris Jerman	30		30			40	100	4	Summer	no
12.	0563466	System design in the industry	Jernej Klemenc, Marko Nagode	30		30			40	100	4	Summer	no
13.	0562723	Professional elective subject S01		30		30			40	100	4	Summer	yes

14.	0562724	Elective subject 01		30		30			40	100	4	Summer	yes
		Total		450	0	450	0	0	600	1500	60		

The professional elective subject S01 for 4 ECTS is chosen by the student at his/her own choice from the set of all compulsory subjects of other subjects of the Higher Professional Study Program Mechanical Engineering - Project Oriented Applied Programme of 1st cycle except for Design of industrial systems.

The elective subject 01 for 4 ECTS is chosen by the student at his/her own choice from the set of all compulsory subjects of other subjects of the Higher Professional Study Program Mechanical Engineering - Project Oriented Applied Programme of 1st cycle except for Design of industrial systems or at his/her own choice in any programme, faculty or university.

Year 3

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0563469	Industry hydraulic systems	Franc Majdič	30		30			40	100	4	Winter	no
2.	0563470	Machine and surface damages	Mitjan Kalin	30		30			40	100	4	Winter	no
3.	0563471	Industrial power-trains	Jernej Klemenc, Simon Oman	30		30			40	100	4	Winter	no
4.	0563472	Safety of Machinery and Equipment	Boris Jerman	30		30			40	100	4	Winter	no
5.	0562729	General elective subject 2		15		15			45	75	3	Winter	yes
6.	0562730	General elective subject 3		15		15			45	75	3	Winter	yes
7.	0562731	Professional elective subject S02		30		30			40	100	4	Winter	yes
8.	0562732	Professional elective subject S03		30		30			40	100	4	Winter	yes

9.	0562733	Development processes in Mechanical Engineering	Aljoša Peperko, 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 Diaci, Janez Kušar, Janez Žerovnik, Janko Slavič, Jernej Klemenc, Joško Valentinčič, Jože Kutin, Jurij Prezelj, Lidija Slemenik Perše , Marko Hočevar, Marko Nagode, Matija Jezeršek, Miha Boltežar, Miha Brojan, Mihael Sekavčnik, Miroslav Halilovič, Mitjan Kalin, Niko Herakovič, Nikolaj Mole, Primož Podržaj, Robert Kunc, Rok Petkovšek, Rok Vrabič, Roman Šturm, Roman Žavbi, Sašo Medved, Tadej Kosel, Tomaž Katrašnik, Tomaž Pepelnjak, Uroš Stritih	90		90			120	300	12	Summer	no
10.	0562734	Practical training	All heads in the programme	5					195	200	8	Summer	no
11.	0562735	Diploma thesis	All heads in the programme		35			70	145	250	10	Summer	no
		Total		305	35	300	0	70	790	1500	60		

Professional elective subjects S02 and S03 for 8 ECTS is chosen by the student at his/her own choice from the set of all compulsory subjects of other subjects of the Higher Professional Study Program Mechanical Engineering - Project Oriented Applied Programme of 1st cycle except for Design of industrial systems.

Production technologies (field of study)

Year 2

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0562711	Mechatronics and control technology	Janez Diaci	30		30			40	100	4	Winter	no
2.	0562712	Machine elements 1 - PAP	Jernej Klemenc, Marko Nagode	45		45			35	125	5	Winter	no
3.	0562713	Engineering Design Methodology - PAP	Janez Benedičič, Roman Žavbi	30		30			40	100	4	Winter	no
4.	0562714	Production technologies 2	Damjan Klobčar, Tomaž Pepelnjak	45		45			35	125	5	Winter	no
5.	0562715	Maintenance	Franc Majdič, Marko Polajnar, Mitjan Kalin	30		30			40	100	4	Winter	no
6.	0562716	Heat and mass transfer	Andrej Kitanovski	30		30			40	100	4	Winter	no
7.	0562717	Programming basics	Miroslav Halilovič, Nikolaj Mole	30		30			40	100	4	Winter	no
8.	0562718	Energy machines and appliances - PAP	Mihael Sekavčnik	30		30			65	125	5	Summer	no
9.	0562719	Measurement practicum	Jože Kutin	30		30			65	125	5	Summer	no
10.	0563505	Non-traditional manufacturing processes	Andrej Lebar, Joško Valentinčič	30		30			40	100	4	Summer	no
11.	0563506	Testing methods in production	Roman Šturm, Tomaž Kek	30		30			40	100	4	Summer	no
12.	0563507	Assembly techno-logy	Niko Herakovič	30		30			40	100	4	Summer	no
13.	0562723	Professional elective subject S01		30		30			40	100	4	Summer	yes
14.	0562724	Elective subject 01		30		30			40	100	4	Summer	yes
		Total		450	0	450	0	0	600	1500	60		

The professional elective subject S01 for 4 ECTS is chosen by the student at his/her own choice from the set of all compulsory subjects of other subjects of the Higher Professional Study Program Mechanical Engineering - Project Oriented Applied Programme of 1st cycle except for Production technologies.

The elective subject 01 for 4 ECTS is chosen by the student at his/her own choice from the set of all compulsory subjects of other subjects of the Higher Professional Study Program Mechanical Engineering - Project Oriented Applied Programme of 1st cycle except for Production technologies or at his/her own choice in any programme, faculty or university.

Year 3

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0563510	Design on forming technologies	Tomaž Pepelnjak	30		30			40	100	4	Winter	no
2.	0563511	Quality assurance	Davorin Kramar	30		30			40	100	4	Winter	no
3.	0563512	Planning of machining and CAM	Franci Pušavec	30		30			40	100	4	Winter	no
4.	0563513	Heat treatment planning	Roman Šturm	30		30			40	100	4	Winter	no
5.	0562729	General elective subject 2		15		15			45	75	3	Winter	yes
6.	0562730	General elective subject 3		15		15			45	75	3	Winter	yes
7.	0562731	Professional elective subject S02		30		30			40	100	4	Winter	yes
8.	0562732	Professional elective subject S03		30		30			40	100	4	Winter	yes

9.	0562733	Development processes in Mechanical Engineering	Aljoša Peperko, 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 Diaci, Janez Kušar, Janez Žerovnik, Janko Slavič, Jernej Klemenc, Joško Valentinčič, Jože Kutin, Jurij Prezelj, Lidija Slemenik Perše , Marko Hočevar, Marko Nagode, Matija Jezeršek, Miha Boltežar, Miha Brojan, Mihael Sekavčnik, Miroslav Halilovič, Mitjan Kalin, Niko Herakovič, Nikolaj Mole, Primož Podržaj, Robert Kunc, Rok Petkovšek, Rok Vrabič, Roman Šturm, Roman Žavbi, Sašo Medved, Tadej Kosel, Tomaž Katrašnik, Tomaž Pepelnjak, Uroš Stritih	90		90			120	300	12	Summer	no

10.	0562734	Practical training	All heads in the programme	5					195	200	8	Summer	no
11.	0562735	Diploma thesis	All heads in the programme		35			70	145	250	10	Summer	no
		Total		305	35	300	0	70	790	1500	60		

The professional elective subject S01 for 4 ECTS is chosen by the student at his/her own choice from the set of all compulsory subjects of other subjects of the Higher Professional Study Program Mechanical Engineering - Project Oriented Applied Programme of 1st cycle except for PProduction technologies.

Production engineering (field of study)

Year 2

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0562711	Mechatronics and control technology	Janez Diaci	30		30			40	100	4	Winter	no
2.	0562712	Machine elements 1 - PAP	Jernej Klemenc, Marko Nagode	45		45			35	125	5	Winter	no
3.	0562713	Engineering Design Methodology - PAP	Janez Benedičič, Roman Žavbi	30		30			40	100	4	Winter	no
4.	0562714	Production technologies 2	Damjan Klobčar, Tomaž Pepelnjak	45		45			35	125	5	Winter	no
5.	0562715	Maintenance	Franc Majdič, Marko Polajnar, Mitjan Kalin	30		30			40	100	4	Winter	no
6.	0562716	Heat and mass transfer	Andrej Kitanovski	30		30			40	100	4	Winter	no
7.	0562717	Programming basics	Miroslav Halilo-vič, Nikolaj Mole	30		30			40	100	4	Winter	no
8.	0562718	Energy machines and appliances - PAP	Mihael Sekavčnik	30		30			65	125	5	Summer	no
9.	0562719	Measurement prac-ticum	Jože Kutin	30		30			65	125	5	Summer	no
10.	0563546	Control and statistical supervision in manufacturing	Drago Bračun, Edvard Govekar	30		30			40	100	4	Summer	no
11.	0563547	Energy and material flows in industry	Iztok Golobič, Janez Kušar	30		30			40	100	4	Summer	no
12.	0563548	Production planning	Janez Kušar, Tomaž Berlec	30		30			40	100	4	Summer	no
13.	0562723	Professional elective subject S01		30		30			40	100	4	Summer	yes
14.	0562724	Elective subject 01		30		30			40	100	4	Summer	yes

	Total	450	0	450	0	0	600	1500	60	

The professional elective subject S01 for 4 ECTS is chosen by the student at his/her own choice from the set of all compulsory subjects of other subjects of the Higher Professional Study Program Mechanical Engineering - Project Oriented Applied Programme of 1st cycle except for Industrial engineering.

The elective subject 01 for 4 ECTS is chosen by the student at his/her own choice from the set of all compulsory subjects of other subjects of the Higher Professional Study Program Mechanical Engineering - Project Oriented Applied Programme of 1st cycle except for Industrial engineering or at his/her own choice in any programme, faculty or university.

Year 3

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0563551	Production leading	Janez Kušar, Tomaž Berlec	30		30			40	100	4	Winter	no
2.	0563552	Robotized production	Marko Šimic, Niko Herakovič	30		30			40	100	4	Winter	no
3.	0563553	Logistics of material and resources	Marko Šimic, Niko Herakovič	30		30			40	100	4	Winter	no
4.	0563554	Investment engineering	Janez Kušar, Tomaž Berlec	30		30			40	100	4	Winter	no
5.	0562729	General elective subject 2		15		15			45	75	3	Winter	yes
6.	0562730	General elective subject 3		15		15			45	75	3	Winter	yes
7.	0562731	Professional elective subject S02		30		30			40	100	4	Winter	yes
8.	0562732	Professional elective subject S03		30		30			40	100	4	Winter	yes

9.	0562733	Development processes in Mechanical Engineering	Aljoša Peperko, Andrej Bombač, Andrej Kitanovski, Andrej Senegačnik, Boris Jerman, Božidar Šarler, Damjan Klobčar, Davorin Kramar, Drago Bračun, Edvard Govekar, Franc	90		90			120	300	12	Summer	no
			Majdič, Franci Pušavec, Iztok Golobič, Janez Diaci, Janez Kušar, Janez Žerovnik, Janko Slavič, Jernej Klemenc, Joško Valentinčič, Jože Kutin, Jurij Prezelj, Lidija Slemenik Perše , Marko Hočevar, Marko Nagode, Matija Jezeršek, Miha Boltežar, Miha Brojan, Mihael Sekavčnik, Miroslav Halilovič, Mitjan Kalin, Niko Herakovič, Nikolaj Mole, Primož Podržaj, Robert Kunc, Rok Petkovšek, Rok Vrabič, Roman Šturm, Roman Žavbi, Sašo Medved, Tadej Kosel, Tomaž Katrašnik, Tomaž Pepelnjak, Uroš Stritih										
10.	0562734	Practical training	All heads in the programme	5					195	200	8	Summer	no
11.	0562735	Diploma thesis	All heads in the programme		35			70	145	250	10	Summer	no
		Total		305	35	300	0	70	790	1500	60		

Professional elective subjects S02 and S03 for 4 ECTS is chosen by the student at his/her own choice from the set of all compulsory subjects of other subjects of the Higher Professional Study Program Mechanical Engineering - Project Oriented Applied Programme of 1st cycle except for Industrial engineering.

Mechatronics (field of study)

Year 2

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0562711	Mechatronics and control technology	Janez Diaci	30		30			40	100	4	Winter	no
2.	0562712	Machine elements 1 - PAP	Jernej Klemenc, Marko Nagode	45		45			35	125	5	Winter	no
3.	0562713	Engineering Design Methodology - PAP	Janez Benedičič, Roman Žavbi	30		30			40	100	4	Winter	no
4.	0562714	Production technologies 2	Damjan Klobčar, Tomaž Pepelnjak	45		45			35	125	5	Winter	no
5.	0562715	Maintenance	Franc Majdič, Marko Polajnar, Mitjan Kalin	30		30			40	100	4	Winter	no
6.	0562716	Heat and mass transfer	Andrej Kitanovski	30		30			40	100	4	Winter	no
7.	0562717	Programming basics	Miroslav Halilo-vič, Nikolaj Mole	30		30			40	100	4	Winter	no
8.	0562718	Energy machines and appliances - PAP	Mihael Sekavčnik	30		30			65	125	5	Summer	no
9.	0562719	Measurement practi-cum	Jože Kutin	30		30			65	125	5	Summer	no
10.	0563951	Programmable logic controllers	Janez Diaci, Rok Vrabič	30		30			40	100	4	Summer	no
11.	0563952	Mechatronic actua-tors	Primož Podržaj	30		30			40	100	4	Summer	no
12.	0563953	Programming for mechatronics	Marjan Jenko	30		30			40	100	4	Summer	no
13.	0562723	Professional elective subject S01		30		30			40	100	4	Summer	yes
14.	0562724	Elective subject 01		30		30			40	100	4	Summer	yes

	Total	450	0	450	0	0	600	1500	60	

The professional elective subject S01 for 4 ECTS is chosen by the student at his/her own choice from the set of all compulsory subjects of other subjects of the Higher Professional Study Program Mechanical Engineering - Project Oriented Applied Programme of 1st cycle except for Mechatronics.

The elective subject 01 for 4 ECTS is chosen by the student at his/her own choice from the set of all compulsory subjects of other subjects of the Higher Professional Study Program Mechanical Engineering - Project Oriented Applied Programme of 1st cycle except for Mechatronics or at his/her own choice in any programme, faculty or university.

Year 3

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0563956	Robotic systems - PAP	Rok Vrabič	30		30			40	100	4	Winter	no
2.	0563957	Laser tech-nique	Matija Jezeršek	30		30			40	100	4	Winter	no
3.	0563958	Mechatronic system control	Janez Diaci, Primož Podržaj	30		30			40	100	4	Winter	no
4.	0577649	Machine vision	Drago Bračun	30		30			40	100	4	Winter	no
5.	0562729	General elective subject 2		15		15			45	75	3	Winter	yes
6.	0562730	General elective subject 3		15		15			45	75	3	Winter	yes
7.	0562731	Professional elective sub-ject S02		30		30			40	100	4	Winter	yes
8.	0562732	Professional elec-tive subject S03		30		30			40	100	4	Winter	yes

9.	0562733	Development processes in Mechanical Engineering	Aljoša Peperko, 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 Diaci, Janez Kušar, Janez Žerovnik, Janko Slavič, Jernej Klemenc, Joško Valentinčič, Jože Kutin, Jurij Prezelj, Lidija Slemenik Perše , Marko Hočevar, Marko Nagode, Matija Jezeršek, Miha Boltežar, Miha Brojan, Mihael Sekavčnik, Miroslav Halilovič, Mitjan Kalin, Niko Herakovič, Nikolaj Mole, Primož Podržaj, Robert Kunc, Rok Petkovšek, Rok Vrabič, Roman Šturm, Roman Žavbi, Sašo Medved, Tadej Kosel, Tomaž Katrašnik, Tomaž Pepelnjak, Uroš Stritih	90		90			120	300	12	Summer	no
10.	0562734	Practical training	All heads in the programme	5					195	200	8	Summer	no
11.	0562735	Diploma thesis	All heads in the programme		35			70	145	250	10	Summer	no
		Total		305	35	300	0	70	790	1500	60		

Professional elective subjects S02 and S03 for 8 ECTS is chosen by the student at his/her own choice from the set of all compulsory subjects of other subjects of the Higher Professional Study Program Mechanical Engineering - Project Oriented Applied Programme of 1st cycle except for Mechatronics.

Airline transport pilot (field of study)

Year 2

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0562711	Mechatronics and control technology	Janez Diaci	30		30			40	100	4	Winter	no
2.	0562712	Machine elements 1 - PAP	Jernej Klemenc, Marko Nagode	45		45			35	125	5	Winter	no
3.	0562713	Engineering Design Methodology - PAP	Janez Benedičič, Roman Žavbi	30		30			40	100	4	Winter	no
4.	0562714	Production technologies 2	Damjan Klobčar, Tomaž Pepelnjak	45		45			35	125	5	Winter	no
5.	0563988	Aircraft maintenance	Franc Majdič, Marko Polajnar, Mitjan Kalin	30		30			40	100	4	Winter	no
6.	0562716	Heat and mass transfer	Andrej Kitanovski	30		30			40	100	4	Winter	no
7.	0562717	Programming basics	Miroslav Halilovič, Nikolaj Mole	30		30			40	100	4	Winter	no
8.	0563991	Professional elective subject S01		30		30			65	125	5	Summer	yes
9.	0579419	Elective professional subject 1		45		15			40	100	4	Summer	yes
10.	0563993	Aircraft engines 1	Tomaž Katrašnik	45		15			40	100	4	Summer	no
11.	0563994	Aeromechanics and airframes	Andrej Grebenšek, Tadej Kosel	70		35			45	150	6	Summer	no
12.	0563995	Mechanics of flight	Miha Brojan	30		30			40	100	4	Summer	no
13.	0563996	Aeronautical meteorology	Gregor Skok	50		30			95	175	7	Summer	no
		Total		510	0	395	0	0	595	1500	60		

Aircraft design and maintenance (field of study)

Year 2

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0562711	Mechatronics and control technology	Janez Diaci	30		30			40	100	4	Winter	no
2.	0562712	Machine elements 1 - PAP	Jernej Klemenc, Marko Nagode	45		45			35	125	5	Winter	no
3.	0562713	Engineering Design Methodology - PAP	Janez Benedičič, Roman Žavbi	30		30			40	100	4	Winter	no
4.	0562714	Production technologies 2	Damjan Klobčar, Tomaž Pepelnjak	45		45			35	125	5	Winter	no
5.	0563988	Aircraft maintenance	Franc Majdič, Marko Polajnar, Mitjan Kalin	30		30			40	100	4	Winter	no
6.	0562716	Heat and mass transfer	Andrej Kitanovski	30		30			40	100	4	Winter	no
7.	0562717	Programming basics	Miroslav Halilovič, Nikolaj Mole	30		30			40	100	4	Winter	no
8.	0563991	Professional elective subject S01		30		30			65	125	5	Summer	yes
9.	0563992	Aircraft instrumentation	Andrej Grebenšek	45		15			40	100	4	Summer	no
10.	0563993	Aircraft engines 1	Tomaž Katrašnik	45		15			40	100	4	Summer	no
11.	0563994	Aeromechanics and airframes	Andrej Grebenšek, Tadej Kosel	70		35			45	150	6	Summer	no
12.	0563995	Mechanics of flight	Miha Brojan	30		30			40	100	4	Summer	no
13.	0564076	Non-destructive testing in aviation	Roman Šturm, Tomaž Kek	30		30			15	75	3	Summer	no
14.	0564077	Aircraft design 1	Radivoj Kikelj	30		30			40	100	4	Summer	no
		Total		520	0	425	0	0	555	1500	60		

Year 3

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0563999	Aircraft systems	Andrej Grebenšek, Tadej Kosel	30		15			55	100	4	Winter	no
2.	0564000	Performance of aircraft	Tomaž Mrlak	60		60			30	150	6	Winter	no
3.	0564001	Aircraft engines 2	Tomaž Katrašnik	30		30			65	125	5	Winter	no
4.	0563430	Hydraulics and pneumatics - PAP	Franc Majdič	30		30			40	100	4	Winter	no
5.	0564084	Aircraft design 2	Radivoj Kikelj	45		30			125	200	8	Winter	no
6.	0562729	General elective subject 2		15		15			45	75	3	Winter	yes
7.	0564086	Elective professional subject		30		30			40	100	4	Summer	yes
8.	0562724	Elective subject 01		30		30			40	100	4	Summer	yes
9.	0564088	Development and maintenance pro-cesses in aueronautics	Franc Majdič, Miha Brojan, Mitjan Kalin, Roman Šturm, Tadej Kosel, Tomaž Katrašnik	30		30			40	100	4	Summer	no
10.	0562734	Practical training	All heads in the programme	5					195	200	8	Summer	no
11.	0562735	Diploma thesis	All heads in the programme		35			70	145	250	10	Summer	no
		Total		305	35	270	0	70	820	1500	60		

The elective subject 01 for 4 ECTS is chosen by the student at his/her own choice from the set of all compulsory subjects of other subjects of the Higher Professional Study Program Mechanical Engineering - Project Oriented Applied Programme of 1st cycle except for Aircraft design and maintenance or at his/her own choice in any programme, faculty or university.

The following **curriculum** is presented for the bachelor's degree programme mechanical engineering – Research and Development Programme:

Year 1

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0562738	Calculus and ordinary differential equations	Aljoša Peperko, Darja Rupnik Poklukar, Janez Žerovnik	75		60			90	225	9	Winter	no
2.	0562739	Physics	Rok Petkovšek	45		30			75	150	6	Winter	no
3.	0562740	Measurements in me-chanical engineering	Gregor Bobovnik, Jože Kutin	30		30			65	125	5	Winter	no
4.	0562741	Statics and kinematics	Gregor Čepon, Miha Boltežar	45		30			50	125	5	Winter	no
5.	0577579	Technical drawing and computer aided modelling of geometry	Nikola Vukašinović, Robert Kunc, Samo Zupan	45		30			50	125	5	Winter	no
6.	0562743	Linear algebra and vector analysis	Aljoša Peperko, Darja Rupnik Poklukar, Janez Žerovnik	60		45			70	175	7	Summer	no
7.	0562744	Strength of materials	Miha Brojan	30		30			40	100	4	Summer	no
8.	0562745	Non-metallic materials - RRP	Lidija Slemenik Perše	45		30			50	125	5	Summer	no
9.	0562746	Thermodynamics	Božidar Šarler, Matjaž Perpar	45		30			75	150	6	Summer	no
10.	0577584	Metals - RRP	Roman Šturm	30		30			40	100	4	Summer	no
11.	0562748	Electrical engineering	Marjan Jenko	30		30			40	100	4	Summer	no
		Total		480	0	375	0	0	645	1500	60		

Year 2

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0562749	Integral transformations and Fourier analysis	Aljoša Peperko, Janez Žerovnik	45		45			60	150	6	Winter	no
2.	0562750	Rigid body dynamics	Miha Boltežar	45		30			75	150	6	Winter	no
3.	0562751	Fluid statics and dynamics	Božidar Šarler	45		30			50	125	5	Winter	no
4.	0601059	Numerical methods	Janko Slavič	45		30			50	125	5	Winter	no
5.	0562753	Machine elements 1 - RRP	Jernej Klemenc, Marko Nagode	45		30			50	125	5	Winter	no
6.	0545374	General elective subject 1 1		15		15			45	75	3	Winter	yes
7.	0577592	Partial differential equations, complex analysis and optimization	Aljoša Peperko, Janez Žerovnik	45		45			35	125	5	Summer	no
8.	0562756	Machine elements 2 - RRP	Jernej Klemenc, Marko Nagode	30		30			40	100	4	Summer	no
9.	0562757	Production technologies 1	Franci Pušavec, Tomaž Pepelnjak	45		30			50	125	5	Summer	no
10.	0562758	Heat transfer	Iztok Golobič	45		30			50	125	5	Summer	no
11.	0577596	Control technology	Drago Bračun, Janez Diaci	30		30			40	100	4	Summer	no
12.	0545375	General elective subject 2		15		15			45	75	3	Summer	yes

13.	0562761	Engineerig Design Methodology - RRP	Janez Bene-dičič, Roman Žavbi	30		30			40	100	4	Summer	no
		Total		480	0	390	0	0	630	1500	60		

Year 2, General elective subject 1 1

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0545347	Engineering re-porting - RRP	Miha Brojan / Franc Majdič / Rok Vrabič / Nikola Vukašinović	15		15			45	75	3	Winter	yes
		Total		15	0	15	0	0	45	75	3		

General elective subject 1 amounting to 3 ECTS is chosen by the student at his/her own choice in any programme, faculty or university. Elective course offered by FME: Poročanje v strojništvu - RRP.

Year 2, General elective subject 2

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0545355	Innovation in Mechani-cal Engineering - RRP	Janez Kušar	15		15			45	75	3	Summer	yes
		Total		15	0	15	0	0	45	75	3		

General elective subject 2 amounting to 3 ECTS is chosen by the student at his/her own choice in any programme, faculty or university. Elective course offered by FME: Inoviranje v strojništvu - RRP

Year 3

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0562764	Numerical modelling methods	Miroslav Halilovič, Nikolaj Mole	30		30			65	125	5	Winter	no
2.	0562765	Tribology	Mitjan Kalin	30		30			40	100	4	Winter	no
3.	0562766	Manufacturing techno-logies 2	Damjan Klobčar, Joško Valentinčič	45		30			50	125	5	Winter	no
4.	0562767	Hydraulics and Pneu-matics - RRP	Franc Majdič, Niko Herakovič	30		30			40	100	4	Winter	no
5.	0577605	Drives	Mitjan Kalin, Tomaž Katrašnik	30		30			40	100	4	Winter	no
6.	0562769	Energy machines and appliances - RRP	Mihael Sekavčnik	30		30			40	100	4	Winter	no
7.	0545376	General elective subject 3		30		30			40	100	4	Winter	yes
8.	0545377	General elective subject 4		30		30			40	100	4	Summer	yes
9.	0577609	Data processing and validation	Edvard Govekar	30		30			40	100	4	Summer	no
10.	0577610	Mechatronics and laser technologies	Janez Diaci, Matija Jezeršek	45		30			50	125	5	Summer	no
11.	0545378	General elective subject 5		15		15			45	75	3	Summer	yes
12.	0545379	General elective subject 6		30		15			55	100	4	Summer	yes
13.	0562776	Final paper	All heads in the programme		35			70	145	250	10	Summer	no
		Total		375	35	330	0	70	690	1500	60		

Year 3, General elective subject 3

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0562777	High-end computing tools	Janez Povh, Leon Kos, Roman Žavbi	30		30			40	100	4	Winter	yes
		Total		30	0	30	0	0	40	100	4		

General elective subject 3 amounting to 4 ECTS is chosen by the student at his/her own choice in any programme, faculty or university. Elective course offered by FME: Napredna računalniška orodja.

Year 3, General elective subject 4

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0562778	Production engine-ering	Janez Kušar, Niko Herakovič	30		30			40	100	4	Summer	yes
		Total		30	0	30	0	0	40	100	4		

General elective subject 4 amounting to 4 ECTS is chosen by the student at his/her own choice in any programme, faculty or university. Elective course offered by FME: Proizvodno inženirstvo.

Year 3, General elective subject 5

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0545370	Interdisciplinary project - RRP	Božidar Šarler, Edvard Govekar, Franci Pušavec, Iztok Golobič, Janez Diaci, Lidija Slemenik Perše , Marko Nagode, Miha Boltežar, Mihael Sekavčnik, Mitjan Kalin, Niko Herakovič, Robert Kunc, Rok Petkovšek, Roman Šturm, Roman Žavbi, Sašo Medved	15		15			45	75	3	Summer	yes
		Total		15	0	15	0	0	45	75	3		

General elective subject 5 amounting to 3 ECTS is chosen by the student at his/her own choice in any programme, faculty or university. Elective course offered by FME: Interdisciplinary project - RRP.

Year 3, General elective subject 6

	Contact hours	

	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Total No. of hours	ECTS	Semesters	Elective
1.	0562780	Environmental engineering	Iztok Golobič, Sašo Medved	30		15			55	100	4	Summer	yes
		Total		30	0	15	0	0	55	100	4		

General elective subject 6 amounting to 4 ECTS is chosen by the student at his/her own choice in any programme, faculty or university. Elective course offered by FME: Okoljsko inženirstvo.

The following **curriculum** is presented for the master's degree programme mechanical engineering – Research and Development Programme:

Energy engineering (field of study)

1. year

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Hours Total	ECTS	Semesters	Elective
1.	6001-M	Experimental mod-eling in energy and process engineering	Marko Hočevar	30		30			65	125	5	Winter	no
2.	6002-M	Advanced combustion processes	Andrej Senegačnik, Tomaž Katrašnik	30		30			65	125	5	Winter	no
3.	6003-M	Energy conversion systems	Mihael Sekavčnik	30		30			65	125	5	Winter	no
4.	-	Professional elective subject S01		30		30			65	125	5	Winter	yes
5.	-	Professional elective subject S02		30		30			65	125	5	Winter	yes

6.	-	General elective subject 1		30		30			65	125	5	Winter	yes
7.	6004-M	Turbomachinery	Marko Hočevar	30		30			65	125	5	Summer	no
8.	6005-M	Processes in heat engines	Tomaž Katrašnik	30		30			65	125	5	Summer	no
9.	6006-M	Chemical energy carriers	Andrej Senegačnik	30		30			65	125	5	Summer	no
10.	-	Professional elective subject S03		30		30			65	125	5	Summer	yes
11.	-	Professional elective subject S04		30		30			65	125	5	Summer	yes
12.	-	General elective subject 2		30		30			65	125	5	Summer	yes
		Total		360	0	360	0	0	780	1500	60		

The student chooses a professional elective subject S01, S02, S03 and S04 in the amount of 20 ECTS at his/her own choice from the set of all compulsory subjects in other fields of study of 2nd Cycle Master's Study Programme in MECHANICAL ENGINEERING – Research and Development Programme, with the exception of Energy engineering.

General electives 1 and 2 amounting to 10 ECTS are chosen by the student at his/her own choice from the set of all compulsory subjects in other fields of 2nd Cycle Master's Study Programme in MECHANICAL ENGINEERING – Research and Development Programme with the exception of Energy engineering or according to his/her choice in any program, faculty or university.

2. year

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Hours Total	ECTS	Semesters	Elective
1.	6007-M	Technical acoustics	Jurij Prezelj	30		30			65	125	5	Winter	no
2.	6008-M	Electromobility	Tomaž Katrašnik	30		30			65	125	5	Winter	no
3.	6009-M	Energy supply in circular economy	Mihael Sekavčnik, Tomaž Katrašnik	30		30			65	125	5	Winter	no

4.	6010-M	Sustainable sources of electric energy	Marko Hočevar	30		30			65	125	5	Winter	no
5.	-	Professional elective subject S05		30		30			65	125	5	Winter	yes
6.	-	Professional elective subject S06		30		30			65	125	5	Winter	yes
7.	6011-M	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 Diaci, Janez Kušar, Janez Žerovnik, Janko Slavič, Jernej Klemenc, Joško Valentinčič, Jože Kutin, Jurij Prezelj, Lidija Slemenik Perše , Marko Hočevar, Marko Nagode, Matija Jezeršek, Miha Boltežar, Miha Brojan, Mihael Sekavčnik, Miroslav Halilovič, Mitjan Kalin,	90		90			195	375	15	Summer	no
			Niko Herakovič, Nikolaj Mole, Primož Podržaj, Robert Kunc, Rok Petkovšek, Rok Vrabič, Roman Šturm, Sašo Medved, Tadej Kosel, Tomaž Katrašnik, Tomaž Pepelnjak, Uroš Stritih										
8.	6012-M	Project practicum - MAG	All heads in the program		15			80	30	125	5	Summer	no
9.	6013-M	Master thesis	All heads in the program		35			70	145	250	10	Summer	no

	Total	270	50	270	0	150	760	1500	60	

The student chooses professional elective course S05 and S06 for ECTS at his own discretion from the set of all compulsory courses in other subjects of 2nd Cycle Master's Study Programme in MECHANICAL ENGINEERING – Research and Development Programme, with the exception of Energy engineering.

Process engineering (field of study)

1. year

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Hours Total	ECTS	Semesters	Elective
1.	6014-M	Transport phenomena	Andrej Kitanovski	30		30			65	125	5	Winter	no
2.	6015-M	Thermodynamics of mixtures	Iztok Golobič	30		30			65	125	5	Winter	no
3.	6016-M	Solar utility technologies	Sašo Medved	30		30			65	125	5	Winter	no
4.	-	Professional elective subject S01		30		30			65	125	5	Winter	yes
5.	-	Professional elective subject S02		30		30			65	125	5	Winter	yes
6.	-	General elective subject 1		30		30			65	125	5	Winter	yes
7.	6017-M	Air-conditioning, heating, refrigeration, ventilation	Uroš Stritih	30		30			65	125	5	Summer	no
8.	6018-M	Computational fluid dynamics	Božidar Šarler	30		30			65	125	5	Summer	no
9.	6019-M	Refrigeration and heat pumps - MAG	Andrej Kitanovski	30		30			65	125	5	Summer	no
10.	-	Professional elective subject S03		30		30			65	125	5	Summer	yes
11.	-	Professional elective subject S04		30		30			65	125	5	Summer	yes
12.	-	General elective subject 2		30		30			65	125	5	Summer	yes
		Total		360	0	360	0	0	780	1500	60		

The student chooses a professional elective subject S01, S02, S03 and S04 in the amount of 20 ECTS at his/her own choice from the set of all compulsory subjects in other fields of study of 2nd Cycle Master's Study Programme in MECHANICAL ENGINEERING – Research and Development Programme, with the exception of Process Engineering.

General electives 1 and 2 amounting to 10 ECTS are chosen by the student at his/her own choice from the set of all compulsory subjects in other fields of the 2nd Cycle Master's Study Programme in MECHANICAL ENGINEERING – Research and Development Programme with the exception of Process Engineering or according to his/her choice in any program, faculty or university.

2. year

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Hours Total	ECTS	Semesters	Elective
1.	6020-M	Heat exchangers	Andrej Kitanovski, Iztok Golobič, Jože Kutin	30		30			65	125	5	Winter	no
2.	6021-M	Process engineering	Iztok Golobič	30		30			65	125	5	Winter	no
3.	6022-M	Smart cities	Andrej Kitanovski, Sašo Medved	30		30			65	125	5	Winter	no
4.	6023-M	Multiphase Systems	Andrej Bombač, Božidar Šarler	30		30			65	125	5	Winter	no
5.	-	Professional elective subject S05		30		30			65	125	5	Winter	yes
6.	-	Professional elective subject S06		30		30			65	125	5	Winter	yes

7.	6011-M	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 Diaci, Janez Kušar, Janez Žerovnik, Janko Slavič, Jernej Klemenc, Joško Valentinčič, Jože Kutin, Jurij Prezelj, Lidija Slemenik Perše , Marko Hočevar, Marko Nagode, Matija Jezeršek, Miha Boltežar, Miha Brojan, Mihael Sekavčnik, Miroslav Halilovič, Mitjan Kalin, Niko Herakovič, Nikolaj Mole, Primož Podržaj, Robert Kunc,	90		90			195	375	15	Summer	no

			Rok Petkovšek, Rok Vrabič, Roman Šturm, Sašo Medved, Tadej Kosel, Tomaž Katrašnik, Tomaž Pepelnjak, Uroš Stritih										
8.	6012-M	Project practicum - MAG	All heads in the program		15			80	30	125	5	Summer	no
9.	6013-M	Master thesis	All heads in the program		35			70	145	250	10	Summer	no
		Total		270	50	270	0	150	760	1500	60		

The student chooses professional elective course S05 and S06 for ECTS at his own discretion from the set of all compulsory courses in other subjects of 2nd Cycle Master's Study Programme in MECHANICAL ENGINEERING – Research and Development Programme, with the exception of Process Engineering.

Engineering design (field of study)

1. year

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Hours Total	ECTS	Semesters	Elective
1.	6024-M	Engineering design techniques	Leon Kos, Nikola Vukašinović	30		30			65	125	5	Winter	no
2.	6025-M	Surface and contact engineering	Mitjan Kalin	30		30			65	125	5	Winter	no
3.	6026-M	Design of advanced systems	Jernej Klemenc, Marko Nagode	30		30			65	125	5	Winter	no
4.	-	Professional elective subject S01		30		30			65	125	5	Winter	yes
5.	-	Professional elective subject S02		30		30			65	125	5	Winter	yes
6.	-	General elective subject 1		30		30			65	125	5	Winter	yes
7.	6027-M	Operational strength	Domen Šeruga, Jernej Klemenc, Marko Nagode	30		30			65	125	5	Summer	no
8.	6028-M	Nanotechnologies	Mitjan Kalin	30		30			65	125	5	Summer	no
9.	6029-M	Geometric Product Specifications	Robert Kunc, Samo Zupan	30		30			65	125	5	Summer	no
10.	-	Professional elective subject S03		30		30			65	125	5	Summer	yes
11.	-	Professional elective subject S04		30		30			65	125	5	Summer	yes
12.	-	General elective subject 2		30		30			65	125	5	Summer	yes
		Total		360	0	360	0	0	780	1500	60		

The student chooses a professional elective subject S01, S02, S03 and S04 in the amount of 20 ECTS at his/her own choice from the set of all compulsory subjects in other fields of study of 2nd Cycle Master's Study Programme in MECHANICAL ENGINEERING – Research and Development Programme, with the exception of Engineering design.

General electives 1 and 2 amounting to 10 ECTS are chosen by the student at his/her own choice from the set of all compulsory subjects in other fields of the 2nd Cycle Master's Study Programme in MECHANICAL ENGINEERING – Research and Development Programme with the exception of Engineering design or according to his/her choice in any program, faculty or university.

2. year

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Hours Total	ECTS	Semesters	Elective
1.	6030-M	Hydraulic components and systems	Franc Majdič	30		30			65	125	5	Winter	no
2.	6031-M	Complex powertrains in mobile ma-chinery	Jernej Klemenc, Marko Nagode, Simon Oman	30		30			65	125	5	Winter	no
3.	6032-M	Lightweight structures	Boris Jerman	30		30			65	125	5	Winter	no
4.	6033-M	Reliability eva-luation and demonstration	Jernej Klemenc, Marko Nagode	30		30			65	125	5	Winter	no
5.	-	Professional elective subject S05		30		30			65	125	5	Winter	yes
6.	-	Professional elective subject S06		30		30			65	125	5	Winter	yes

7.	6011-M	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 Diaci, Janez Kušar, Janez Žerovnik, Janko Slavič, Jernej Klemenc, Joško Valentinčič, Jože Kutin, Jurij Prezelj, Lidija Slemenik Perše , Marko Hočevar, Marko Nagode, Matija Jezeršek, Miha Boltežar, Miha Brojan, Mihael Sekavčnik, Miroslav Halilovič, Mitjan Kalin, Niko Herakovič, Nikolaj Mole, Primož Podržaj, Robert Kunc, Rok Petkovšek, Rok Vrabič, Roman Šturm, Sašo Medved, Tadej Kosel, Tomaž Katrašnik, Tomaž Pepelnjak, Uroš Stritih	90		90			195	375	15	Summer	no
8.	6012- M	Project practicum - MAG	All heads in the program		15			80	30	125	5	Summer	no
9.	6013-M	Master thesis	All heads in the program		35			70	145	250	10	Summer	no
		Total		270	50	270	0	150	760	1500	60		

The student chooses professional elective course S05 and S06 for ECTS at his own discretion from the set of all compulsory courses in other subjects of 2nd Cycle Master's Study Programme in MECHANICAL ENGINEERING – Research and Development Programme, with the exception of Engineering design.

Mechanics (field of study)

1. year

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Hours Total	ECTS	Semesters	Elective
1.	6034-M	Advanced strength of materials	Miha Brojan	30		30			65	125	5	Winter	no
2.	6035-M	Advanced Dynamics	Miha Boltežar, Gregor Čepon	30		30			65	125	5	Winter	no
3.	6036-M	Mechanics of structural elements	Miroslav Halilovič	30		30			65	125	5	Winter	no
4.	-	Professional elective subject S01		30		30			65	125	5	Winter	yes
5.	-	Professional elective subject S02		30		30			65	125	5	Winter	yes
6.	-	General elective subject 1		30		30			65	125	5	Winter	yes
7.	6037-M	FEM structural analysis	Miroslav Halilovič, Nikolaj Mole	30		30			65	125	5	Summer	no
8.	6038-M	Dynamics of machines and structures	Janko Slavič, Miha Boltežar, Gregor Čepon	30		30			65	125	5	Summer	no
9.	6039-M	Signal processing	Janko Slavič	30		30			65	125	5	Summer	no
10.	-	Professional elective subject S03		30		30			65	125	5	Summer	yes
11.	-	Professional elective subject S04		30		30			65	125	5	Summer	yes
12.	-	General elective subject 2		30		30			65	125	5	Summer	yes
		Total		360	0	360	0	0	780	1500	60		

The student chooses a professional elective subject S01, S02, S03 and S04 in the amount of 20 ECTS at his/her own choice from the set of all compulsory subjects in other fields of study of 2nd Cycle Master's Study Programme in MECHANICAL ENGINEERING – Research and Development Programme, with the exception of Mechanics.

General electives 1 and 2 amounting to 10 ECTS are chosen by the student at his/her own choice from the set of all compulsory subjects in other fields of 2nd Cycle Master's Study Programme in MECHANICAL ENGINEERING – Research and Development Programme with the exception of Mechanics or according to his/her choice in any program, faculty or university.

2. year

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Hours Total	ECTS	Semesters	Elective
1.	6040-M	Mechanics of light-weight structures	Miha Brojan	30		30			65	125	5	Winter	no
2.	6041-M	Experimental modal analysis	Janko Slavič	30		30			65	125	5	Winter	no
3.	6042-M	Rheology of polymers	Lidija Slemenik Perše	30		30			65	125	5	Winter	no
4.	6043-M	Numerical modelling of technological processes	Miroslav Halilovič, Nikolaj Mole	30		30			65	125	5	Winter	no
5.	-	Professional elective subject S05		30		30			65	125	5	Winter	yes
6.	-	Professional elective subject S06		30		30			65	125	5	Winter	yes

7.	6011-M	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 Diaci, Janez Kušar, Janez Žerovnik, Janko Slavič, Jernej Klemenc, Joško Valentinčič, Jože Kutin, Jurij Prezelj, Lidija Slemenik Perše , Marko Hočevar, Marko Nagode, Matija Jezeršek, Miha Boltežar, Miha Brojan, Mihael Sekavčnik, Miroslav Halilovič, Mitjan Kalin, Niko Herakovič, Nikolaj Mole, Primož Podržaj, Robert Kunc, Rok Petkovšek, Rok	90		90			195	375	15	Summer	no
			Vrabič, Roman Šturm, Sašo Medved, Tadej Kosel, Tomaž Katrašnik, Tomaž Pepelnjak, Uroš Stritih										
8.	6012-M	Project practicum - MAG	All heads in the program		15			80	30	125	5	Summer	no
9.	6013-M	Master thesis	All heads in the program		35			70	145	250	10	Summer	no
		Total		270	50	270	0	150	760	1500	60		

The student chooses professional elective course S05 and S06 for ECTS at his own discretion from the set of all compulsory courses in other subjects of 2nd Cycle Master's Study Programme in MECHANICAL ENGINEERING – Research and Development Programme, with the exception of Mechanics.

Production engineering (field of study)

1. year

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Hours Total	ECTS	Semesters	Elective
1.	6044-M	Micromanufacturing technologies	Joško Valentinčič	30		30			65	125	5	Winter	no
2.	6045-M	Advanced machining processes	Franci Pušavec	30		30			65	125	5	Winter	no
3.	6046-M	Heat treatment	Roman Šturm	30		30			65	125	5	Winter	no
4.	-	Professional elective subject S01		30		30			65	125	5	Winter	yes
5.	-	Professional elective subject S02		30		30			65	125	5	Winter	yes
6.	-	General elective subject 1		30		30			65	125	5	Winter	yes
7.	6047-M	Advanced forming processes	Tomaž Pepelnjak	30		30			65	125	5	Summer	no
8.	6048-M	Assembly and Handling Systems	Marko Šimic, Niko Herakovič	30		30			65	125	5	Summer	no
9.	6049-M	Production planning and organization	Janez Kušar, Tomaž Berlec	30		30			65	125	5	Summer	no
10.	-	Professional elective subject S03		30		30			65	125	5	Summer	yes
11.	-	Professional elective subject S04		30		30			65	125	5	Summer	yes
12.	-	General elective subject 2		30		30			65	125	5	Summer	yes
		Total		360	0	360	0	0	780	1500	60		

The student chooses a professional elective subject S01, S02, S03 and S04 in the amount of 20 ECTS at his/her own choice from the set of all compulsory subjects in other fields of study of 2nd Cycle Master's Study Programme in MECHANICAL ENGINEERING – Research and Development Programme, with the exception of Production Engineering.

General electives 1 and 2 amounting to 10 ECTS are chosen by the student at his/her own choice from the set of all compulsory subjects in other fields of the 2nd Cycle Master's Study Programme in MECHANICAL ENGINEERING – Research and Development Programme with the exception of Production Engineering or according to his/her choice in any program, faculty or university.

2. year

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Hours Total	ECTS	Semesters	Elective
1.	6050-M	Quality en-gineering	Davorin Kramar	30		30			65	125	5	Winter	no
2.	6051-M	CAM systems	Franci Pušavec	30		30			65	125	5	Winter	no
3.	6052-M	Additive technologies	Damjan Klobčar, Edvard Govekar	30		30			65	125	5	Winter	no
4.	6053-M	Smart factories	Marko Šimic, Niko Herakovič	30		30			65	125	5	Winter	no
5.	-	Professional elective subject S05		30		30			65	125	5	Winter	yes
6.	-	Professional elective subject S06		30		30			65	125	5	Winter	yes

7.	6011-M	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 Diaci, Janez Kušar, Janez Žerovnik, Janko Slavič, Jernej Klemenc, Joško Valentinčič, Jože Kutin, Jurij Prezelj, Lidija Slemenik Perše , Marko Hočevar, Marko Nagode, Matija Jezeršek, Miha Boltežar, Miha Brojan, Mihael Sekavčnik, Miroslav Halilovič, Mitjan Kalin, Niko Herakovič, Nikolaj Mole, Primož Podržaj, Robert Kunc, Rok Petkovšek, Rok Vrabič, Roman Šturm, Sašo Medved, Tadej Kosel, Tomaž Katrašnik, Tomaž Pepelnjak, Uroš Stritih	90		90			195	375	15	Summer	no

8.	6012-M	Project practicum - MAG	All heads in the program		15			80	30	125	5	Summer	no
9.	6013-M	Master thesis	All heads in the program		35			70	145	250	10	Summer	no
		Total		270	50	270	0	150	760	1500	60		

The student chooses professional elective course S05 and S06 in the amount of 10 ECTS at his own discretion from the set of all compulsory courses in other subjects of 2nd Cycle Master's Study Programme in MECHANICAL ENGINEERING – Research and Development Programme, with the exception of Production Engineering.

Mechatronics and laser technology (field of study)

1. year

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Hours Total	ECTS	Semesters	Elective
1.	6054-M	Microprocessor control	Janez Diaci, Primož Podržaj	30		30			65	125	5	Winter	no
2.	6055-M	Robotic systems - MAG	Rok Vrabič	30		30			65	125	5	Winter	no
3.	6056-M	Algorithms and protocols	Rok Vrabič	30		30			65	125	5	Winter	no
4.	-	Professional elective subject S01		30		30			65	125	5	Winter	yes
5.	-	Professional elective subject S02		30		30			65	125	5	Winter	yes
6.	-	General elective subject 1		30		30			65	125	5	Winter	yes
7.	6057-M	Discrete control systems	Janez Diaci, Primož Podržaj	30		30			65	125	5	Summer	no
8.	6058-M	Laser systems	Matija Jezeršek	30		30			65	125	5	Summer	no
9.	6059-M	Photonics and laser sources	Rok Petkovšek, Vid Agrež	30		30			65	125	5	Summer	no
10.	-	Professional elective subject S03		30		30			65	125	5	Summer	yes
11.	-	Professional elective subject S04		30		30			65	125	5	Summer	yes
12.	-	General elective subject 2		30		30			65	125	5	Summer	yes
		Total		360	0	360	0	0	780	1500	60		

The student chooses a professional elective subject S01, S02, S03 and S04 in the amount of 20 ECTS at his/her own choice from the set of all compulsory subjects in other fields of study of 2nd Cycle Master's Study Programme in MECHANICAL ENGINEERING – Research and Development Programme, with the exception of Mechatronics and Laser Technology.

General electives 1 and 2 amounting to 10 ECTS are chosen by the student at his/her own choice from the set of all compulsory subjects in other fields of 2nd Cycle Master's Study Programme in MECHANICAL ENGINEERING – Research and Development Programme with the exception of Mechatronics and Laser Technology or according to his/her choice in any program, faculty or university.

2. year

				Contact hours									
	Code	Title	Heads of subject	Lectures	Seminars	Practical work	Clinical work	Other forms of study	Independent work	Hours Total	ECTS	Semesters	Elective
1.	6060-M	Laser measurement systems	Matija Jezeršek	30		30			65	125	5	Winter	no
2.	6061-M	Laser processing technology	Matija Jezeršek, Peter Gregorčič	30		30			65	125	5	Winter	no
3.	6062-M	Advanced sen-sory systems and networks	Primož Podržaj	30		30			65	125	5	Winter	no
4.	6063-M	Manufacturing automation	Drago Bračun	30		30			65	125	5	Winter	no
5.	-	Professional elective subject S05		30		30			65	125	5	Winter	yes
6.	-	Professional elective subject S06		30		30			65	125	5	Winter	yes

7.	6011-M	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 Diaci, Janez Kušar, Janez Žerovnik, Janko Slavič, Jernej Klemenc, Joško Valentinčič, Jože Kutin, Jurij Prezelj, Lidija Slemenik Perše , Marko Hočevar, Marko Nagode, Matija Jezeršek, Miha Boltežar, Miha Brojan, Mihael Sekavčnik, Miroslav Halilovič, Mitjan Kalin, Niko Herakovič, Nikolaj Mole,	90		90			195	375	15	Summer	no

			Primož Podržaj, Robert Kunc, Rok Petkovšek, Rok Vrabič, Roman Šturm, Sašo Medved, Tadej Kosel, To-maž Katrašnik, Tomaž Pepelnjak, Uroš Stritih										
8.	6012-M	Project practicum - MAG	All heads in the program		15			80	30	125	5	Summer	no
9.	6013-M	Master thesis	All heads in the program		35			70	145	250	10	Summer	no
		Total		270	50	270	0	150	760	1500	60		

The student chooses professional elective course S05 and S06 for ECTS at his own discretion from the set of all compulsory courses in other subjects of 2nd Cycle Master's Study Programme in MECHANICAL ENGINEERING – Research and Development Programme, with the exception of Mechatronics and Laser Technology.