

The Curriculum for Master of Science in Engineering (Innovation and Business)

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Academic Study Board of the Faculty of Engineering

Programme titles:

- Civilingeniør i Innovation and Business
- Master of Science in Engineering (Innovation and Business)

ECTS value: 120
Cities: Sønderborg
Semesters: Autumn

Effective date: 01-09-2019
Applicable for students enrolled: 01-09-2018

Version: Archive

▼ § 1 - Description of the Programme

▼ § 1.1 - Applicable for students enrolled

01-09-2018

▼ § 1.2 - Aim of Programme, including any professional profile and specialisations

The purpose of the Master's programme is to

- extend students' professional knowledge and competences and increase their theoretical and methodical qualifications and level of independent work beyond the level attained at the bachelor level.
- provide students with the opportunity for in-depth academic study via the use of advanced elements of the disciplines and methods of the academic area, including training in scientific work and methodology to develop the student's competences to perform more specialised vocational functions and participate in scientific development work, and
- to qualify the student for further education, including PhD programmes, cf. the Danish Ministerial Order on the PhD Programme at Universities.

The Master's programme is an independent, complete educational programme, which extends the competence and insights acquired by the student during the bachelor programme.

The Master's programme aims to qualify the student to solve complex technical problems, design and implement complex technological products and systems in a social context. The contents of the Master's programme aim to provide the student with advanced professional competences within the chosen discipline of engineering and options for further specialisation.

The Master's programme is a full-time programme which is rated at 120 ECTS points, corresponding to the work of a full-time student for 22 months; for programmes starting in the spring semester, however, the duration is 24 months. The programme consists of constituent course elements related to the programme's specific professional competences and identity, elective courses and a Master's thesis.

Graduates with a bachelor degree that includes knowledge and competences similar to those acquired via a bachelor programme in technical science or engineering are entitled to use the Danish title of civilingeniør, cand.polyt., followed by the title of the specific programme. The English version of the title is Master of Science (MSc) in Engineering - followed by the title of the specific programme.

▼ § 1.3 - Didactic and pedagogical basis

The Engineering Education Model of the University of Southern Denmark

The Bachelor and Master programmes within the scientific area of engineering are research-based full-degree programmes which qualify the students to independently perform vocational functions on the basis of knowledge and methodical skills within their professional area.

All programmes at the University of Southern Denmark are structured in accordance with the university's leading principles for programmes. For engineering programmes, the principles are put into practice in the educational concept 'The Engineering Education Model of the University of Southern Denmark' or, in Danish, 'Den Syddanske Model for Ingeniøruddannelser', in the following referred to by its official abbreviation, DSMI.

By offering and implementing engineering programmes based on DSMI, the university ensures that engineers who have recently graduated from the university have a high professional standard, based on their mastery of a range of core skills which are in high demand on the labour market as well as in the research community.

A summary of the main points of the education concept is shown below - the complete description of DSMI is available in electronic form at the Faculty's website.

Content and Competences

- Professional skills are at the centre of the educational activities, and all engineering programmes at the University of Southern Denmark are therefore rooted in research and development environments of a high international standard. Research and development-based tuition is provided at all programme levels to accommodate both the needs of fundamental research and the requirements of practical applied science in close collaboration with business and industry.
- The programmes aim to foster modern, dyed-in-the-wool engineers. The learning and evaluation environment is therefore based on activating tuition and active learning that stimulates students to think and work in a problem-focused, project-oriented and cross-disciplinary manner. Assignments are accomplished both in teams and independently, and the focus is on innovation and reflection.
- The programmes are designed to mature students to perform assignments in an international context. During the course of their studies, students experience an environment characterised by international teachers and researchers and fellow students from many countries. The programme framework is organised in such a way as to provide good opportunities to study abroad and students enrolled on study programmes offered in Danish, will be required to attend courses conducted in English.
- Bachelors from the University of Southern Denmark will have worked in project groups across language and cultural differences.
- To enhance the graduates' labour market value immediately after graduation, the study programmes incorporate a high level of business relevance. Collaboration with private organisations guarantees that the students' professional competences are put to regular use in a concrete, contemporary context.
- In the course of their studies, Bachelors from the University of Southern Denmark will have performed project work in collaboration with external organisations.
- All students are encouraged to think and practise entrepreneurship via a learning and evaluation environment designed to stimulate student enterprise, creativity and responsibility.
- Corporate and business understanding are integral elements of the teaching of the Bachelor programmes at the University of Southern Denmark.
- Bachelors from the University of Southern Denmark have participated in interdisciplinary collaboration projects organised on the basis of a principle of 'experts in teams'. This means that the student collaborates with students from other engineering disciplines or other study programmes on the solution of a complex, interdisciplinary problem in close collaboration with an external organisation.

Structure and Learning Environment

In overall terms, the interplay between programme structure, skills acquisition and the learning and evaluation environment of the engineering programmes at the University of Southern Denmark may be described as follows:

- In the practical planning of the programme content, significant emphasis has been placed on ensuring that the forms of tuition and examination are both relevant and contemporary and support students' acquisition of core skills. In doing so, efforts are made to provide a highly dynamic study environment, where each individual student is expected to play an active role and assume responsibility for his or her own learning. The student will 'learn to learn' so that he or she will later be able to quickly embrace new and complex problems, just as the student will be encouraged throughout the programme to practise both independent and co-operative thinking.
- In order to strengthen both the professional contemplation and application of acquired skills as well as the individual's continued motivation for developing professionally and personally on a labour market characterised by rapid change, the educational concept deliberately seeks to integrate both specific technical and broader general engineering skills.
- With DSMI, the University of Southern Denmark offers an attractive and relevant study programme with good immediate work prospects. The keywords are activating tuition and active learning put into practice through project-oriented collaboration and problem-based learning. The purpose is to foster dyed-in-the-wool engineers with a high level of professional skills and the optimum basis for continued personal and professional development.

▼ § 2 - Enrollment

▼ § 2.1 - Legal claim for admission

Following degree has automatic claim for admission:

- BSc in Engineering Innovation and Business- University of Southern Denmark

▼ § 2.2 - Qualifying degrees

The university has assessed that the below degrees qualify for admission. The list is not exhaustive:

- BSc in Engineering in Mechatronics - University of Southern Denmark

- BEng in Engineering Mechatronics - University of Southern Denmark

- BEng in Engineering Interaction Design - University of Southern Denmark

Following degrees qualify for admission, provided that the degree covers 5 ECTS of Entrepreneurship, Marketing, Business administration or Innovation Management:

- BEng in Electronic Design - University of Aarhus (Herning)
- BEng in Mechanical Engineering (Maskinteknik) - University of Aalborg
- BEng in Mechanical Engineering (Maskinteknik) - University of Aalborg (Esbjerg)
- BEng in Mechanical Engineering (Maskinteknik) - Technical University of Denmark

▼ § 2.3 - Entry requirements

2.3.1 To be considered for admission applicants must have a relevant bachelor of science degree, bachelor of science in engineering degree, or bachelor of engineering degree.

For a degree to be relevant it must be in the subject area of Innovation & Business and cover the below criteria:

- Mechanical design, statics, dynamics and 3D CAD (15 ECTS)
- Electronics (10 ECTS)
- Programming (10 ECTS)
- Entrepreneurship, Marketing, Business administration or Innovation management (5 ECTS)

Admission with a foreign degree

Applicants with a bachelor degree from a foreign university who meet the above requirements are eligible for admission subject to an academic assessment and comparison of whether the applicant's academic qualifications correspond to those of qualifying Danish degree.

English language skills

Native English-speaking applicants or applicants with a bachelor degree taught exclusively in English do not have to provide evidence of their English language skills.

Non-native English speaking applicants from a country within the European Union or the EEA are not required to pass an IELTS or a TOEFL test, if they can demonstrate knowledge of English corresponding with English at B level, as a minimum.

Applicants from a country outside the European Union or the EEA, however, must pass an IELTS or a TOEFL test with a minimum result of 6.5 in the IELTS test or a minimum result of 88 in the TOEFL test.

For further details, please refer to the University website.

2.3.2 As a rule, the applicant must apply for admission to a Master's programme at the University of Southern Denmark within five years after completing the Bachelor programme.

▼ § 2.4 - Supplementary courses

2.4.1 Should the applicant's degree fail to meet the entry requirements, it is possible to acquire the necessary skills through supplementary courses offered at the University of Southern Denmark. The extent of supplementary courses cannot exceed 5 ECTS points.

2.4.2 Supplementary courses have to be taken after admission to the programme. The supplementary activities must be passed within the examination period of the ordinary examination and students will have only two examination attempts.

▼ § 3 - Detailed programme specific information

▼ § 3 - Programme title and profiles

▼ Master of Sciences (MSc) in Engineering (Innovation and Business)

Name

Master of Sciences (MSc) in Engineering (Innovation and Business)

Competence profile

With a Master of Science in Engineering - Innovation and Business, the graduate possesses solid competences within the field of product and production based on business development within mechatronics. The education will enable the students to handle the innovation process from exploring and discovering new ideas to planning, managing and finally specifying and realizing own business ideas or concepts. The students gain the competencies to work as intrapreneurs in existing companies or to start up their own company or to proceed with a career in industry or academia.

The graduate will have acquired the following overall knowledge, skills and competencies.

KNOWLEDGE

A: Possesses knowledge about the complexity and diversity of developing mechatronic products and production in a quickly changing environment which is based on the highest international research within the areas of product innovation and manufacturing research

B: Is able to manage innovation projects where technology is turned into new businesses.

C: Is able to work with innovation in practice and collaborate with industry as well as other external stakeholders

D: Is able to understand and apply design thinking and design approaches, including mapping techniques, modelling, games and simulation methods.

E: Is able to reflect on the discipline specific knowledge in the above mentioned fields and address new scientific issues or problems

SKILLS

A: Is able to evaluate, select and apply theories, models and tools to master the innovation process in order to assess the potential of a promising technology, product and business ideas including funding opportunities.

B: Is able to apply skills in the collaborative and participatory design process including open innovation.

C: Is able to apply skills regarding product and production development techniques, project management and related working methods.

D: Is able to understand and apply design thinking and design approaches, including mapping techniques, modelling, games and simulation methods.

E: Is able to analyse, evaluate and search for business opportunities based on a combination of the market driven and the technology driven approach.

F: Is able to present and communicate scientific results across various communities both within the university and beyond.

G: Is able to deliberately convey meaningful melody, sound-segment and body-language elements or combinations thereof during presentations or conversations in order to subtly influence the dialogue partner's reactions/attitudes, emotions, or memorization of information; for example, in business negotiations, in persuading customers, or in "selling ideas".

COMPETENCES

A: Is able to analyse, plan and organize new and complex innovation processes which are unpredictable and which might require new solutions.

B: Is able to initiate new projects as well as work independently in scientific projects within the university as well as with industrial companies.

C: Is able to act as a professional and responsibility taking person in relation to the development of the academic and personal proficiency

Professional competence

Innovation and Business is a master of science in engineering that combines innovation, technology and business disciplines and courses. The students become business-oriented engineers (I&B engineer). In a collaborative and participatory way they integrate technology, business and use. The I&B engineer is able to deal with different types of innovation challenges both in small and in larger enterprises (Intrapreneurship) The I&B engineer is also able to discover and create new opportunities and turn them into new businesses (entrepreneurship). The I&B engineer is internationally oriented and is able to think globally. Thus, he can respond productively to challenges in our complex and rapid evolving society. A master of science in innovation and business provides the students with special core competencies within the following areas:

- Creativity, Design and Innovation skills for stimulating innovation in already existing companies or in new start-up firms
- Elaborated skills in Mechatronics related to product and production technologies, systems and corresponding software
- Product and production-driven intra- and entrepreneurship
- Collaborative skills to understand and facilitate the participatory process between stakeholders and organizations
- Competencies in business development, logistics and production setup
- Knowledge about business administration and marketing for evaluating market and business opportunities

The combination of engineering, business and innovation competences enable the graduate to work in various jobs in modern companies, where interdisciplinary and cross-functionality is a path to success. Understanding the process from development of product ideas to specifying and realising sustainable production and businesses makes the graduate an important link between various functions and specialists within an organization. Emphasizing the international dimension during the education provides global opportunities. Finally, graduates have the possibility to pursue a career within academia. Possible job profiles for a graduate are:

Project manager

The project manager is able to work with innovation in companies regarding products, production and businesses. The candidate is able to, understand, analyse and turn complex technology into applications and new solutions. His/Her oral and written communication skills allow him/her to exchange and realize ideas creatively and dynamically within organizations. The profound economic and technological knowledge allows him/her to recognize and realize market and technology-oriented ideas faster and better than the competitors.

Innovation Manager

The Innovation Manager is able to coordinate and lead the innovation development process based on open and participatory innovation. His communicative, economic and technological skills allow him/her to manage innovation development across different departments and across companies. The candidate is a team player and is able to orchestrate the interdisciplinary and multidimensional process of innovation, independently of whether this process is situated on the institutional or the corporate level.

Business Developer

The Business Developer/Innovator is able to detect and analyse signals for change and development on the corporate level, as well as on the institutional or regional level, in order to develop bearing strategies that are both economically and technologically sound. His/her specific communication skills together with knowledge of economics and technology allow him/her to coordinate and mediate between the institutional level and the corporate level.

Entrepreneur

Entrepreneurs who are willing to combine expertise and entrepreneurship are able to take the challenge to develop, market, and manage their own ideas from the beginning through to the end. Graduates of Innovation and business acquire the needed skills to develop their own products, perform the market research and to setup the logistics and production facilities to realise a business.

System Integrator

The Innovation and Business candidate has a good overview of mechatronics technologies and when it comes to new solutions in mechatronics (energy solutions, medico, welfare, high tech manufacturing, transportation etc.) the candidate is able to specify and design the solution in a sustainable way combining economic, environmental and social aspects.

Operations Engineer and Manager

The candidate has the economic and technological knowledge as well as the communicative skills to develop, adjust and coordinate industrial companies' supply chains, distribution and production, according to demand from global markets. The candidate focuses on sustainability and the circular economy related to the Cradle to Cradle strategies and methods.

Researcher (PhD-Student)

The graduate is qualified to enter academia and pursue an academic career within university. Society's demand for knowledge and innovation as a means to gain competitive advantage and improve quality of life increases the need for innovation researchers. To develop businesses of the future, research in future products, innovation, production and productivity is crucial.

Programme structure

Semester 4 30 ECTS	<u>Master's Thesis - 30 ECTS</u> <u>T350027401</u> (30 ects)				
Semester 3 30 ECTS ↑	<u>Entrepreneurial Finance</u> <u>T310007401</u> (5 ects)	<u>Mechatronics Design and Build 2</u> <u>T350005401</u> (5 ects)	▲ Select one of four specialisation tracks (see comments for details) (15 ects)		Elective (5 ects)
Semester 2 30 ECTS	<u>Participatory Innovation</u> <u>T310004401</u> (10 ects)		<u>High-Tech Business Venturing</u> <u>T310005401</u> (10 ects)	<u>Persuasive Communication and Negotiation</u> <u>T310006401</u> (5 ects)	<u>Mechatronics Design and Build 1</u> <u>T350006401</u> (5 ects)
Semester 1 30 ECTS	<u>Innovation of Technology and Business</u> <u>T310000401</u> (10 ects)	<u>Design thinking and prototyping skills</u> <u>T310001401</u> (5 ects)	<u>Open Innovation Management</u> <u>T310002401</u> (5 ects)	<u>Glocalized Production</u> <u>T310003401</u> (5 ects)	▲ Software for Embedded Systems (MC-SES) OR Optimization & Image Processing (MC-OIP) (5 ects)

■ = Elective

Explanatory comments to programme structure

The 3rd semester contains the following specialisation tracks:

- 1) THS40 - 40 ECTS thesis (10 ECTS) + 10 ECTS elective
- 2) MC-VF - In-company Project (15 ECTS) + 1 elective (5 ECTS)
- 3) IBEST - Entrepreneurship Training (15 ECTS) + 1 elective (5 ECTS)
- 4) Electives (20 ECTS)

Students are also encouraged to complete the 3rd semester at a foreign university. Please note that the courses must be approved by the Academic Study Board of the Faculty of Engineering.

Cities

Soenderborg

Language

English

▼ § 3.1 - The structure of the programme

The progression within the programme takes place within the following subject columns:

- Mechatronic product development and production
- Entrepreneurship and business development
- Innovation management and participatory innovation

Mechatronics product development and production

The modules that belong to this subject column are IBITB, IBGLP, MC-SES or MC-OIP, MC-MDB1, MC-MDB2 and THS-U1 and THS-U2

The progression will be from the first semester focusing at integrated product development and setting up competitive production and supply chain facilities. The students will get to understand the Glocalized Production approach with global competition plus local design and implementation of adaptive production businesses. Second semester is about designing and building mechatronic products and systems related to industrial companies, the students will get to understand the design process and be able to model mechatronics solutions and research state of the art production technology. In the 3rd semester prototype products and production are in focus to be able to test and discuss functionality, quality and robustness of the mechatronics design. On this semester the scale up production will be considered including manufacturing processes, level of automation to be able to establish a competitive business. Master thesis projects within this domain of high tech mechatronics products and production will be an option at the 4th semester.

Entrepreneurship and business development

The modules that belong to this subject column are IBITB, IBDTPS, IBPCN, IBHTBV, IBEST, IBENF, THS-U2

The progression in this subject column can be characterized as the increased theoretical understanding and practical experience within the domain. The students learn in the first how the entrepreneurship should work in theory and in the 2nd, and 3rd. semester they apply their knowledge, skills and competencies and experience the case of realizing their own idea. The students make progress on the theoretical ladder and they develop their personal and practical experience which makes them able to undertake and initiate work independently and with many stakeholders. Due to this progression they are finally able to write their master thesis in the 4th semester with the required theoretical and practical depth.

Innovation Management and participatory innovation

The modules that belong to this subject column are IBITB, IBOIM, IBPIN, MC-VF, THS-U1 and THS-U2.

In this subject column, the students get in the 1st. semester acquainted with fundamental issues and perspectives on what innovation means and the challenges of managing an innovation process with many different stakeholders. In the 2nd and 3rd. semester the students learn more specifically about users as important stakeholders and about institutional barriers for managing innovations. Finally, the students experience innovation practice during their internship which make them able to proceed with their thesis in the 4th semester.

Description of the 1st semester

Semester theme: Innovation, technology and business in theory

The courses on the first semester are organized in a way so that they can adapt to the level of entrance from relevant bachelor programmes - according to the entry requirements mentioned later in this document.

Specifically this means that the students might get assigned readings depending on their back-grounds. If students have a background with more courses in programming and less in innovation management, the lecturers will make sure that they will get additional readings in the necessary domains. This is to make sure that the students have the same knowledge foundation when they enter the second semester.

VALUE ARGUMENT

Today, innovation solutions are often complex and interdisciplinary, for example when it comes to innovation within welfare, medico, energy, where many parties and stakeholders are involved. At this semester, we want to present the journey that takes place when turning technology into innovation.

The 1st semester introduces the students to different theoretical perspectives on innovation and they discover and experience the innovation process. The students learn about innovation theories and methods and how innovation and business is understood and managed in practice. The students work with industrial companies to investigate how professional organisations manage innovation. The students work with technologies in mechatronics from a theoretical point of view through research publications as well as through practical hands-on courses. The students will learn about business development and how to develop an efficient business plan. The students have to perform practical innovation by in a creative way transform researched technology to a physical product and argue for the business potential. In the process, the business development regarding sustainable logistics and manufacturing has to be illustrated and argued. The students will in a practical way discover the entire value chain in business development. The knowledge provided will enhance the students' capabilities within innovation practice as well as enhance their competencies within a specific business or technology subject. This semester prepares them for the coming semesters, where the gained understanding should be used in other related innovation courses as well as in the technical or business

LEARNING OBJECTIVES for the 1st semester are the following

KNOWLEDGE

- Is able to understand the complexity of an innovation process and the management of innovation based on different theoretical perspectives
- Is able to understand core theoretical concepts and methods in creativity used for idea generation.
- Is able to understand different scientific methods and reflect on their choice of methods
- Is able to understand new production paradigms

SKILLS

- Is able to apply relevant methods and tools in the various step of the innovation process
- Is able to read and interpret technical research publications and by combining this with the practical mechatronics disciplines be able to reflect and creatively work with product, production and business development
- Is able to create business plans and assess the business potential of the idea

COMPETENCES

- Possesses a coherent and holistic view of mechatronics solutions and as a system integrator build basic mechatronics systems and embedded control systems
- Be able to understand and apply scientific methods in performing basic research, and be able to present findings in a structured way to academia and other stakeholders
- Be able to meaningfully combine the different theoretical fields and practices for facilitating and communication of the innovation process

MODULES

The 1st semester contains the following modules:

IBITB - Innovation of Technology and Business (10 ECTS)

IBDTPS - Design Thinking and Prototyping Skills (5 ECTS)

IBOIM - Open Innovation Management (5 ECTS)

IBGPR - Globalized Production (5 ECTS)

MC-SES or MC-OIP - Software for Embedded Systems or Optimization & Image Processing (5 ECTS)

The modules (IBITB, IBDTPS, IBOIM, IBGLP and MC-SES or MC-OIP) are constituent, obligatory modules.

CONTEXT

The semester provides an advanced theoretical introduction. In the following, this is elaborated for each of the modules.

IBITB: The course will provide students with knowledge and competence in how to work with ad-vanced literature in the domains innovation, technology and business. The students will experience the practice of creating innovation in a multi-disciplinary context, and as "Innovation Engineers", perform own innovative solutions. The proposed innovative solutions will be assessed from a com-mercial point of view and presented in a final business plan.

Furthermore, the course will cover introduction to scientific methods and research. The students will learn about researching the process, work with scientific articles, learn how research questions are formulated and how a research design is developed. In relation to the innovation practice the students will learn how to acquire, analyze and disseminate knowledge from various information sources.

IBDTPS: The course presents theories of Design Thinking and prototyping in the context of technology and innovation. The main concepts of Design Thinking and prototyping will be introduced and applied, as far as possible. The goal is to deepen the understanding of Design Thinking and prototyping for the development of products and services, with a key focus on applying design tools and methods in an innovation process.

IBOIM: The course presents the students with different perspectives on and challenges related to managing open innovation, which relies on the distributed nature of innovative knowledge, technology and commercialization opportunities. During the course, the students will increase their understanding about the theory and practice of open innovation, they will develop their ability to identify, grasp and analyse scientific and practical material, synthesize this material, and present their (critical) view on relevant concepts, theories and practices. Finally they will improve their analytic and decision-making competences in the context of open innovation.

IBGPR: The aim of the course is to present new manufacturing paradigms to students and challenge their understanding of how manufacturing set-ups could be. The students learn in this course about global challenges for industrial production businesses and how to work with highly automated production facilities and global local supply chains.

MC-SES: The students will learn about the following content:

- Object-oriented programming in C++
- Classes
- Inheritance
- Polymorphism
- Templates
- Exceptions
- Algorithm analysis - big O calculations
- Lists, stack, queues, hash maps, Trees
- Graphs and their algorithms

or

MC-OIP: The students will learn about the following content:

- Basic concepts and core algorithms in image processing, exemplified in engineering-relevant use cases
- Mathematical foundations and basic principles of optimization.
- Methods for constrained and unconstrained, linear and nonlinear, local and global optimiza-tion.

Description of the 2nd Semester

Semester theme: Innovation, technology and business in practice

VALUE ARGUMENT

Innovation can be performed on an individual basis, but in reality innovation is mostly performed in participation among various people and stakeholders. Innovation challenges are complex where new methods and social interactions are required. In this semester, students will learn how to manage innovation in practice and get some hands on experience in starting up a technology based new business venture.

The students learn about the process of starting up a new business and experiment with practice through interaction with industry, users and other stakeholders. The technical courses allow the students to experience how industry develop products and production technologies and they experiment with technologies, which they turn into physical products or prototypes.

LEARNING OBJECTIVES for the 2nd semester are the following

KNOWLEDGE

- Understand the concepts of technology and use in practice
- Be able to use and apply theories of user-driven innovation, initiate and facilitate conversa-tions about innovation between stakeholders.
- Relate project experiences to literature within the field
- Have knowledge of the role of technology in entrepreneurship, both for internal venturing and for launching a startup company.
- Understand key elements regarding material, processes and surface treatments
- Understand the Mechatronic Design Process.
- Understand actuators and the devices needed to power Mechatronic systems.
- Have knowledge about modelling and mechatronic design concepts to provide intelligent sensing and adaptive controls.

SKILLS

- Initiate and facilitate conversations about innovation between employees, users and other stakeholders. Choose and apply appropriate methods for user studies, sense-making, user co-creation, participatory business modelling etc.
- Able to apply high-tech business venturing concepts, theories and tools in practice from idea generation, to feasibility analysis, to a complete business plan.
- Able to develop and communicate the relevant and integral aspects of the high tech business venturing process.
- Get acquainted with speaking in front of an audience; practicing how to use (and not to overuse) the learned speech and body-language patterns in the context of presentations and adjusted to the respective audience (= hitting the right note for specific audiences like customers and investors)
- Understand simulation, control and signal processing methods, to improve the precision of Mechatronic devices.

COMPETENCES

- Organize innovation projects with user participation and establish action research activities in an organisation.
- Able to implement the newly acquired knowledge and skills in a relevant business plan for a technology-based internal venture or new company.
- Propose, defend and critically reflect on choices with regard to the high tech business ven-ture.
- Able to work together in an entrepreneurial team, while also taking responsibility for one's own actions and learning.
- Able to develop the awareness of entrepreneurship as a career option, including an under-standing of what type of entrepreneurial role would fit oneself.
- Able to motivate employees (and hence enhance, for example, innovation processes) and colleagues, the ability to convince supervisors, the ability to win argument and to win over an audience

MODULES

The 2nd semester contains the following modules:

IBPIN - Participatory Innovation (10 ECTS)

IBHTBV - High Tech Business Venturing (10 ECTS)

IBPCN - Persuasive Communication and Negotiation (5 ECTS)

MC-MDB1 - Mechatronics Design and Build 1 (5 ECTS)

The modules IBPIN, IBHTBV, IBPCN and MC-MDB1 are constituent, obligatory modules.

CONTEXT

IBPIN: This module introduces history and approaches of user-driven innovation (usability engineering, participatory design, design anthropology, lead-user approach and others). It discusses how these approaches play out in an industrial organisation: The uptake of provocative user knowledge, collaborative sense-making, user empathy and identity forming, social shaping of innovation, participatory

business modelling. The course is project based and will embrace the topics from The high tech business venturing course and the mechatronics design and build course. IBHTBV: This course provides the students with a profound understanding on the role, analytics, and process of business planning that lead to the successful creation of a new business venture. The students will learn how to rigorously prepare for the actual starting-up of either an internal venture or a new company. They will have to engage in all the important stages that precede the formal starting up: from idea generation, to feasibility analysis, to a fully conceived plan that maps out how the venture will operate and how it will create value.

IBPCN: The course provides the students with knowledge and practice on how speech melodies, codes etc. can be used in communication and negotiations. This enhances the students' ability to convey their message clearer and in a more persuasive manner, which should be used to persuade audiences such as investors or other stakeholders.

MC-MDB1: The course will provide students with the confidence and knowledge to undertake mechatronic design and build projects. This is done by exposing students to research topics associated with Mechatronics, Embedded Systems and Control Engineering. The students will be introduced to the design rules and principles when designing and building mechatronics elements and systems. The MDB 1 course also contains scientific methods and their application within the engineering applications.

Description of the 3rd Semester

Semester theme: Specialisation or Exchange

VALUE ARGUMENT

The purpose of the 3rd semester is to give the students the opportunity to choose a specialization within entrepreneurship (entrepreneurship training), Innovation practice (In-company period), innovation and mechatronics research (thesis) or take a number of electives. This specialization has a weight of 20 ECTS. The students can also go for an exchange abroad.

The specialization tracks are the following:

I.40 ECTS master thesis. Building upon the previous semesters this track starts up the master project corresponding to 10 ECTS in the 3rd semester. On this track, two elective courses are offered.

II. In-company period. Students can take an internship in an industrial company to work with innovation projects in the company. The innovation project is typically leading up to the master project and will involve one assigned professor from MCI. These students have the option to choose one elective course.

III. Entrepreneurship training. Students choosing this track can continue working on their own business idea which they may have initiated during the first two semesters. The students have to choose one elective course.

Besides this, the students will get a deeper understanding of entrepreneurial finance e.g. the over-view on the financing challenges that innovative projects and technology start-ups face. Including topics such as valuation, funding rounds, investors, venture capital, exit strategies.

The students will also get advanced knowledge within the field of mechatronics development (design and build) which is building on top of the knowledge gained in the previous semester.

Exchange possibilities

The Faculty recommends and supports, that students go for a one semester exchange at another university abroad. On the Master of Science in Engineering in Innovation and Business the third semester can be used for this purpose. The In-Company Period/Start of Thesis/Entrepreneurship training + elective part (20 ECTS) can be exchanged to elective courses at our partner universities and the remaining 10 ECTS can be exchanged with relevant courses - that contains a majority of the same topics. The exchange programme must be approved by the Academic Study Board.

LEARNING OBJECTIVES for the 3rd semester are the following:

KNOWLEDGE

- Basic understanding of how to navigate in complex organizations with many stakeholders and political relationships
- Coherent/holistic view on innovation or mechatronic research to such an extent that a research profile/topic can be selected.

SKILLS

- Be able to define relevant issues related to own entrepreneurship ideas according to technology, product, production, marketing, financing etc. or
- Through an internship in a company, students can challenge the company on innovation principles and how to apply innovative technologies seen from an innovation architect's point of view.

COMPETENCES

- Be able to understand, analyse and perform advanced issues concerning mechatronics design and build seen from a system integrator's point of view

MODULES

The 3rd semester contains the following modules:

IBENF - Entrepreneurial Finance (5 ECTS)

MC-MDB2 - Mechatronics Design and Build 2 (5 ECTS)

Specialisation tracks:

a) THS-U1 - Thesis (10 ECTS) + 10 ECTS elective

b) MC-VF - In company period (15 ECTS) + 1 elective (5 ECTS)

c) IBEST - Entrepreneurship Training (15 ECTS) + 1 elective (5 ECTS)

d) Electives (20 ECTS)

The modules IBENF and MC-MDB2 are constituent, obligatory modules. The modules THS-U1, MC-VF, IBEST and the electives are part of the elective block.

CONTEXT

IBENF: The course provides an overview on the financing challenges that innovative projects and technology start-ups face. Including topics such as valuation, funding rounds, investors, venture capital, exit strategies

The course is aimed at engineering students interested in gaining a global understanding on how the financing for creative and innovative technology projects works. The course goal is to provide students with the capacity to establish financing strategies that are linked to the technology product-market strategy and overall needs of a company.

The course has a focus on high technology projects in the context of an existing organization or as part of a new venture, thus it aims to prepare students for financing decisions either as entrepreneurs or as innovation projects managers. A combination of insights from financial theory and real case studies provide with practical application and hands-on learning of the course concepts.

MC-MDB2: The aim of the module is to provide students with the opportunity to carry out research-oriented design and build projects in the general area of Mechatronics. On this semester, the final prototype has to be developed. The available projects will reflect the research interests of the Mads Clausen Institute which are at the same time relevant and of interests of the students. Projects will, for example, encompass smart actuators (modelling and control), embedded systems and control engineering for a variety of different applications.

THS-U1: The students should work on a thesis proposal during this course. The selection of the topic should be within one of the key areas of the Innovation and Business education. During the course, the content of the master thesis will be discussed including: Formulating a research problem/question, writing a critical literature review and propose an appropriate research design/methodology.

IBIBT: The purpose is that students work closely with an industrial company. Students are responsible for making the agreement with the company and to get a company supervisor. During the internship, students have to analyse and document the innovation process, evaluate their contribution to the process and reflect critically upon these activities. By means of critical thinking, students have to challenge the company with new theories and methodology for performing Innovation.

IBEST: The purpose is that students work on their own entrepreneurial ideas focusing on becoming an entrepreneur and setting up a new business. The student or group of students are able to define, a market need, select a market segment, develop their product idea, assess new technology or something that may lead to a new business. A supervisor in a company or even a sponsor may be found that can challenge and assist the business idea and assist the students in taking the next steps.

Electives: The students will have the possibility to select a number of electives (20 ECTS) as part of their specialization.

Description of the 4th Semester

VALUE ARGUMENT

The student shall through the selected research problem document his/her engineering-specific competencies obtained during his/her work with a limited, relevant and engineering-specific subject.

LEARNING OBJECTIVES for the 4th semester are the following

KNOWLEDGE

- Be acquainted with relevant engineering skills based on the highest level of international research.
- Attain good understanding of - and be able to reflect on - relevant knowledge.
- Apply scientific methods and tools.

SKILLS

- Identify scientific problems and formulate research questions.
- Be able to identify and review the relevant scientific literature and develop a conceptual framework to empirical work.
- Assess, select and apply scientific methods, tools and competencies within the subject area of the course
- Explain and discuss relevant professional and scientific problems.
- Present novel analysis and problem-solving models.
- Disseminate research-based knowledge.
- Set up a clear framework for the thesis including a proper scientific structure.
- Be able to communicate in a clear and understandable manner.

COMPETENCES

- Be able to independently initiate and carry out discipline-specific and cross-disciplinary cooperation and to assume professional responsibility.
- Manage work and development situations that are complex and unforeseen and require new solution models.
- Take responsibility for own professional development and specialization.

MODULES

4th semester contains:

THS-U2 - Master Thesis (30 ECTS)

The module THS-U2 is a constituent, obligatory module.

▼ § 3.1.1 - Connection between entry requirements and the first year

The courses on first semester are organized in a way that students can adapt to the level of entrance from relevant bachelor programs - according to the entry requirements mentioned later in this document.

▼ § 4 - Course Descriptions

▼ § 4 - Compulsory courses

Course descriptions in the curriculum

▼ Optimization and Image Processing

▼ Course ID

T350000401

▼ Course Title

Optimization and Image Processing

▼ ECTS value

5

▼ Internal Course Code

MC-OIP

▼ Responsible study board

Academic Study Board of the Faculty of Engineering

▼ SES Software for Embedded Systems

▼ Course ID

T350001401

▼ Course Title

SES Software for Embedded Systems

▼ ECTS value

5

▼ Internal Course Code

MC-SES

▼ Responsible study board

Academic Study Board of the Faculty of Engineering

▼ Open Innovation Management

▼ Course ID

T310002401

▼ Course Title

Open Innovation Management

▼ ECTS value

5

▼ Internal Course Code

IBOIM

▼ Responsible study board

Academic Study Board of the Faculty of Engineering

▼ Innovation of Technology and Business

▼ Course ID

T310000401

▼ Course Title

Innovation of Technology and Business

▼ ECTS value

10

▼ Internal Course Code

IBITB

▼ Responsible study board

Academic Study Board of the Faculty of Engineering

▼ Glocalized Production

▼ Course ID

T310003401

▼ Course Title

Glocalized Production

▼ ECTS value

5

▼ Internal Course Code

IBGPR

▼ Responsible study board

Academic Study Board of the Faculty of Engineering

▼ Design thinking and prototyping skills

▼ Course ID

T310001401

▼ Course Title

Design thinking and prototyping skills

- ▼ **ECTS value**
5
- ▼ **Internal Course Code**
IBDTPS
- ▼ **Responsible study board**
Academic Study Board of the Faculty of Engineering
- ▼ **Mechatronics Design and Build 1**- ▼ **Course ID**
T350006401
- ▼ **Course Title**
Mechatronics Design and Build 1
- ▼ **ECTS value**
5
- ▼ **Internal Course Code**
MC-MDB1
- ▼ **Responsible study board**
Academic Study Board of the Faculty of Engineering
- ▼ **Participatory Innovation**- ▼ **Course ID**
T310004401
- ▼ **Course Title**
Participatory Innovation
- ▼ **ECTS value**
10
- ▼ **Internal Course Code**
IBPIN
- ▼ **Responsible study board**
Academic Study Board of the Faculty of Engineering
- ▼ **High-Tech Business Venturing**- ▼ **Course ID**
T310005401
- ▼ **Course Title**
High-Tech Business Venturing
- ▼ **ECTS value**
10
- ▼ **Internal Course Code**
IBHTBV
- ▼ **Responsible study board**
Academic Study Board of the Faculty of Engineering
- ▼ **Persuasive Communication and Negotiation**- ▼ **Course ID**
T310006401
- ▼ **Course Title**
Persuasive Communication and Negotiation
- ▼ **ECTS value**
5
- ▼ **Internal Course Code**
IBPCN
- ▼ **Responsible study board**
Academic Study Board of the Faculty of Engineering
- ▼ **Entrepreneurial Finance**- ▼ **Course ID**
T310007401
- ▼ **Course Title**
Entrepreneurial Finance
- ▼ **ECTS value**
5
- ▼ **Internal Course Code**
IBENF
- ▼ **Responsible study board**
Academic Study Board of the Faculty of Engineering
- ▼ **In-Company Project**- ▼ **Course ID**

T350025401

▼ **Course Title**

In-Company Project

▼ **ECTS value**

15

▼ **Internal Course Code**

MC-VF

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Entrepreneurship Training**

▼ **Course ID**

T310008401

▼ **Course Title**

Entrepreneurship Training

▼ **ECTS value**

15

▼ **Internal Course Code**

IBEST

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Master's Thesis - 40 ECTS**

▼ **Course ID**

T350029401

▼ **Course Title**

Master's Thesis - 40 ECTS

▼ **ECTS value**

40

▼ **Internal Course Code**

THS40

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Mechatronics Design and Build 2**

▼ **Course ID**

T350005401

▼ **Course Title**

Mechatronics Design and Build 2

▼ **ECTS value**

5

▼ **Internal Course Code**

MC-MDB2

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Master's Thesis - 30 ECTS**

▼ **Course ID**

T350027401

▼ **Course Title**

Master's Thesis - 30 ECTS

▼ **ECTS value**

30

▼ **Internal Course Code**

THS

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **§ 5 - Examination provisions**

▼ **§ 5.1 - Programme passing requirements**

5.1.1 An examination is considered to be passed and a course is considered to be approved when the student has attained the assessment 'passed', 'approved' or the grade of 2 or higher.

5.1.2 An examination examination is either graded in accordance with the 7-point grading scale, or is assessed as 'Passed / Failed' (Bestået / ikke-bestået) or 'Approved / Non-approved' (Godkendt / Ikke-godkendt). The Master's thesis is always graded in accordance with the 7-point grading scale.

5.1.3 The 'Passed/failed' and 'approved/non-approved' forms of assessment can account for no more than one-third of the programme's total number of ECTS points. This does not apply to credit transfers from previous examinations.

5.1.4 When the basis for assessing a study activity is 'tuition attendance' - this assessment is made by a teacher based on criteria students are informed of at the beginning of the course. The condition for awarding the assessment 'approved' is that the student must have achieved the objectives established for the course to such an extent that it would result in the assessment 'Approved' or a grade of 02 at minimum at an examination.

5.1.5 The basis for assessment in connection with tuition attendance may be one or more of the following:

- attendance at lectures and exercises
- completed laboratory work, portfolios and reports and completed assignments or other practical or theoretical work
- participation in guiding internal examinations

- participation in seminars.

5.1.6 The student must be notified whether or not his/her participation in the course activities has been approved before the end of the semester.

5.1.7 The study programme has been successfully completed when the student has attained:

- the grade of 2 or higher in all examinations graded in accordance with the 7-point grading scale
- the assessment 'passed' in all examinations assessed as either 'Passed' or 'Failed'
- the assessment 'Approved' in all examinations assessed as either 'Approved' or 'Non-approved'.

▼ § 5.2 - Special exams

Examinations Abroad

5.2.1 The Academic Study Board can grant dispensation to take examinations at a Danish representation or other site abroad, when there are exceptional circumstances that prevent the student from taking the examination(s) in Denmark. The examination can be set up as a video conference or by using other technical aids.

5.2.2 The student is responsible for all practical arrangements related to the examination.

5.2.3 All costs linked to holding the examination, cancellation of the examination due to illness (if applicable) and problems with connecting to the system, etc., for which SDU cannot be held liable, shall be paid by the student.

▼ § 5.2.1 - Start of study exam

5.2.1.1 Students enrolled on a Master's programme starting from the study start in February 2020 must take and pass a study start examination in order to continue on their programme. The purpose of the study start examination is to verify that students have commenced their programme.

5.2.1.2 The content and evaluation form of the study start test are described in the course description.

▼ § 5.3 - Spelling and writing skills

5.3.1 The assessment of the Master's thesis and other major written assignments must also, in addition to the technical content, address the student's spelling and language proficiency, regardless of the language in which the project is written.

5.3.2 The projects must be written in a concise and easily understandable language. The wording of the written presentations or the Master's thesis may have a positive or negative impact on the overall grade. Additional information on the language requirements is provided in the course descriptions.

5.3.3 The Academic Study Board may grant dispensation from the above spelling and wording requirements for students who can document that they suffer from a relevant, specific impairment (such as dyslexia).

▼ § 5.4 - Internal or external exams

5.4.1 Examinations are either external or internal. External examinations are assessed by the teacher(s) and one or more external examiners appointed by the Danish Agency for Science and Higher Education. Internal examinations are assessed by one or more teachers appointed by the university.

5.4.2 At least one-third of the programme's total number of ECTS points must be documented by external assessment. This includes the most important components of the programme, including the Master's thesis, but does not apply to credits transferred from other examinations.

▼ § 5.5 - Exam language

5.5.1 For study programmes offered in Danish, examinations will be conducted in Danish, unless part of the purpose of an examination is to document the student's foreign language proficiency. Examinations may be taken in Swedish or Norwegian instead of Danish, unless the purpose of the examination is to document the student's proficiency in Danish.

5.5.2 For study programmes or individual courses offered in English or other foreign language, examinations will be conducted in that language, unless part of the purpose of an examination is to document the student's proficiency in a different language. The same applies if a course has been taught in a foreign language. The Academic Study Board may grant dispensation from this rule.

5.5.3 In addition, circumstances permitting, the Academic Study Board may allow students wishing to take an examination in a foreign language, to do so. This, however, does not apply to examinations which require presentations to be given in Danish. The Academic Study Board may grant dispensation from this rule.

▼ § 5.6 - Forms of assessment

Purpose

5.7.1 The purpose of the examination is to assess whether and to which extent the student's qualifications match the learning objectives laid down in the Danish Ministerial Order on Bachelor and Master's (Candidatus) Programmes at Universities (the University Programme Order, Uddannelsesbekendtgørelsen), the Curriculum and the respective semester planning. The final examination provides the basis for issuing a diploma.

Examination forms

5.7.2 The programme includes a variety of examination forms to reflect the content and working methods of the tuition provided. The examination forms must accommodate the purpose of the individual course/course element, and may include:

- oral, written and practical examinations, project-oriented courses and combinations of the different forms of examination.

5.7.3 Any requirements on mandatory attendance or completion of written assignments, etc., during the study period which must be met in order for the student to be allowed to take an examination at the end of the course or course element are specified in the relevant course description.

5.7.4 All written campus-based examinations must be completed using a computer in accordance with the University of Southern Denmark's rule set for written examinations.

Assessment of Group Assignments

5.7.5 Projects are normally completed by groups of students. As a rule, these groups consist of six students. The Head of Programme may allow a group to consist of fewer or more students, based on an individual professional assessment. However, these provisions do not apply to the Master's thesis.

Sound and/or Image Recordings

5.7.6 The use of sound and image recordings during an examination is not allowed, unless such recordings are part of the examination procedure. If so, such recordings will be made by the university.

Examination Aids

5.7.7 The use of examination aids is specified in the individual semester plans.

▼ § 5.7 - Irregularities at exams

Disciplinary Action

5.8.1 Disciplinary action will be taken against a student who:

- unlawfully seeks or offers help with the completion of an examination paper, or
- brings non-allowed examination aids to an examination, or
- passes the work of another off as his/her own, or
- cites his/her own previously evaluated work without adding proper references, or
- is otherwise found guilty of cheating at the examination

cf. Rules regarding Disciplinary Measures for Students at the University of Southern Denmark.

5.8.2 Disciplinary action may also be taken against a student who acts in an interruptive manner during an examination.

Errors and Defects in an Examination

5.8.3 If a student discovers errors or defects in an examination, the student must contact the evaluators (for oral examinations) or the invigilators (for written examinations).

5.8.4 In case of aggravated errors or defects, or where this must be considered the most appropriate way to remedy the error or defect, the university may cancel the examination and make arrangements to conduct an extraordinary examination. Re-examination due to cancellation of the original examination may result in a lower mark.

5.8.5 The university may offer an extraordinary examination in connection with other errors or defects. The offer must apply to all students whose examinations are affected by the error or defect in question. A student who has taken the extraordinary examination may choose to retain the original assessment given.

▼ § 5.8 - Special examination conditions

5.9.1 Students with physical or mental impairments, a native language other than Danish or similar difficulties may apply to the Academic Study Board to be granted special examination conditions. The Academic Study Board will accommodate the request if this is found necessary in order to place such students on an equal footing with others during the examination. It is a condition that the alteration does not imply a change of the level of examination.

5.9.2 The application deadline for special examination conditions is 1 September for the winter examination term and 1 February for the summer examination term. In case of chronic impairments, the Academic Study Board may approve special examination conditions for the rest of the Master's programme.

5.9.3 The diploma will not include any information on special conditions.

▼ § 5.9 - Ordinary exams

5.10.1 Ordinary examinations will be held immediately at the end of the course leading up to the examination.

5.10.2 The student must be prepared to sit examinations throughout the examination period, but not in July. This also applies in situations when a planned examination is moved due to *force majeure*.

▼ § 5.10 - Reexams

Reexams and Make-up Exams

5.11.1 Students who did not pass the ordinary examination and students who have been prevented from attending the examination due to illness or other unforeseen circumstances, can register for a re-examination.

5.11.2 Make-up examinations are held at the same time as re-examinations.

5.11.3 Re-examinations will be held during the same examination term as the ordinary examination. The examination period for the autumn semester is 2 January - 28/29 February and for the spring semester 1 June - 31 August. In some cases, exams can also be held in December and May. Examinations are not held in July, unless warranted by special circumstances.

5.11.4 The student shall register for a re-examination within eight days after publication of the results of the ordinary examination. Students who have been absent from the ordinary examination, shall register for a re-examination within 8 days from the date the ordinary examination was held.

5.11.5 Students cannot withdraw from registration for re-examination and it will count as a failed examination attempt if the student does not take the examination unless the Academic Study Board has granted dispensation from this rule due to extraordinary circumstances.

5.11.6 Re-examination may take a different form of examination or assessment than the ordinary examination. Students will be notified of any change in the form of examination or assessment before the examination. The form of examination for the Master Thesis, however, cannot be changed.

Consequences for not having passed an exam by 2nd attempt

5.11.7 If the student does not attend or pass the ordinary examination and the relevant re-exam, the student can register to take the examination the next time the ordinary examination is held. The student must comply with the registration period.

5.11.8 If the student failed an examination on the second attempt, the student must participate in the course and re-submit all assignments prior to the next ordinary examination, unless the course is no longer offered.

▼ § 5.11 - Exam attempts

5.12.1 A passed examination cannot be retaken.

5.12.2 A student has three attempts to pass an examination. If warranted by extraordinary circumstances, the Academic Study Board may grant additional examination attempts. The question of academic ability cannot be considered in assessing whether or not such extraordinary circumstances exist. Supplementary courses in connection with Master's programmes constitute an exception to this rule as the student has only two (2) examination attempts where supplementary activities are concerned.

5.12.3 A student whose tuition attendance is to be assessed for the second time may demand an examination instead. Tuition attendance associated with practical exercises, however, cannot be replaced by an examination.

▼ § 5.12 - Requirements for exams

Failure to Meet Examination Requirements

5.13.1 If students do not meet examination requirements, this will be regarded as one examination attempt unless the Academic Study Board grants dispensation from this rule due to extraordinary circumstances.

Absence from Examination Activities

5.13.2 If the student is absent from an examination, this leads to the student losing an examination attempt. If the evaluation of a course is based on an overall evaluation of two or more examination activities, absence from one or more activities leads to the student being registered as absent from the entire examination. The Academic Study Board can grant dispensation from this rule, if there are extraordinary circumstances.

Participation in Group Assignments

5.13.2 The student is required to participate actively in group assignments. For this reason, the work will be supervised by the academic supervisor. If a student fails to meet the requirement on active participation, the relevant programme co-ordinator, following the academic supervisor's or the Head of Programme's recommendation, may decide that the student be excluded from the group. The applicable criteria for assessing whether the group assignment work has been performed satisfactorily will be laid down for the assignment at the start of the supervision

▼ § 5.13 - Group exams

5.15.1 Examinations are arranged as individual or group examinations.

5.15.2 The basis for assessment is always individual, and individual grades are given.

5.15.3 The course description specifies the maximum number of students who can participate in a group examination. It will not be possible to choose an individual examination instead of a group examination, the examination in Master's Thesis being an exception from this rule.

▼ § 6 - Credit transfer

▼ § 6.1 - Transfer of credit

6.1 The student must apply for credit transfer for course elements passed from all previous study programmes at Master's level immediately after enrolling in the programme in question at the Faculty of Engineering.

▼ § 6.2 - Transfer of credit

6.2.1 Students who wish to take course elements from a different course or at another institute of higher education in Denmark or abroad as part of their study programme can apply to the Academic Study Board for pre-approved credit transfers for planned course elements.

6.2.2. Students who wish to take on student exchange abroad for at least a semester, must have passed courses corresponding to at least 30 ECTS points on the respective Master's study programme. Furthermore, the student exchange may not lead to an extension of the student's study period.

6.2.3 The Academic Study Board must have pre-approved credits for courses offered in the autumn semester and which form part of the student's pool of electives no later than at the Study Board's meeting in August. Likewise the Academic Study Board must have pre-approved credits for courses offered in the spring semester and which form part of the student's pool of electives no later than at the Study Board's meeting in January.

6.2.4 The Academic Study Board must have pre-approved credits for courses offered in the autumn semester and which are to replace constituent courses in the curriculum no later than at the Study Board's meeting in April. Likewise, The Academic Study Board must have preapproved credit transfer for courses offered in the spring semester and which are to replace constituent subjects in the curriculum no later than at the Study Board's meeting in November.

6.2.5 A decision of pre-approval of credit transfer puts the student under the obligation of sending documentation for passed study activities to the Academic Study Board.

6.2.6 Students must re-apply for pre-approved credit transfers if they cannot attend one or more of the course elements for which they have obtained pre-approved credit transfers.

▼ § 6.3 - Credit

6.3.1 Based on an academic assessment, the Academic Study Board may allow credit transfers for courses passed in a previous higher education programme in Denmark or abroad.

6.3.2 In order for a student to be entitled to a Danish diploma and a Danish title, no more than two-thirds of the Master's programme can be completed abroad.

6.3.3 It will not be possible to transfer credits from a Master's thesis forming the basis of a title under one Master's programme to a different title under a different Master's programme.

6.3.4 The possibilities of credit transfers will always depend on the Academic Study Board's assessment of the level of equivalence between the relevant programme components.

6.3.5 Previously passed programme components can only entitle credit transfers if they are at Master's level.

6.3.6 Course elements whose contents coincide in part or in full with the contents of constituent course elements of the study programme in question or with any already passed course elements cannot be approved as elective courses or entitle to credit transfers to the study programme. Elective courses include all course elements which have been approved by the Academic Study Board and which are not mandatory for the programme in which the student is enrolled.

6.3.7 Credit transfers are only given upon production of an original, official transcript of records (hard copy) showing the passed study activities.

6.3.8 Credit transfer with grades is possible only when the previously passed study activity was graded in accordance with the 7-point grading scale, and when there is equivalence between the previously passed study activity and the study activity being substituted. Such equivalence must exist both in terms of the technical contents and in terms of the scope of the activity, as measured in ECTS points.

▼ § 7 - Provisions on the organisation of the programme

▼ § 7.1 - Enrollment and Unenrollment from teaching and exams

Course and exam registration

7.1.1 Registration for tuition and examinations shall be conducted in compliance with SDU's rules on registering for courses and examinations.

7.1.2 The prerequisite for participating in tuition and examinations during each semester is that the student registers for the semester's activities within the deadlines.

7.1.2.1 Registration for tuition and examination takes place electronically on Student Services Online at <https://sso.sdu.dk>.

7.1.2.2 The registration periods are May for tuition during the autumn semester and December for tuition during the spring semester. The registration period is published on the website and is sent by e-mail to students' SDU e-mail addresses. It is the student's responsibility to keep abreast of the time limits for registration.

7.1.3 Registration for a course (obligatory or elective) involves automatic registration for tuition and the associated ordinary examination and a second examination attempt (re-examination), if applicable. Registration for both compulsory and elective courses is binding. However, electives can be changed. See 7.1.4

7.1.3.1 If the student registers for courses additional to the 30 new ECTS points per semester, this registration will also be binding and cannot be cancelled.

7.1.4 Students may swap electives within the first two weeks of the start of each semester, provided they have not used examination attempts in the electives in question.

7.1.5 The student must register for tuition and examination when the subject is offered for the final time.

7.1.6 It is the responsibility of students to check their registrations at the start of the semester.

7.1.7 The university is not obliged to let a student attend courses beyond the level required to complete the study programme.

Course and Exam Withdrawal

7.1.8 Withdrawal is not permitted and absence from an examination will be considered a failed examination attempt, unless the Academic Study Board grants dispensation for withdrawal from one or more courses. The student must apply for withdrawal before the exam in the course in question is held.

▼ § 7.2 - Deadline for programme completion

Maximum Study Period

7.3.1 A student must have completed the Master's programme within two-and-a-half years of commencing the programme in compliance with SDU's Rules on Completion Times for Bachelor, Profession Bachelor or Master's Programmes. These periods do not include any periods of granted leave.

7.3.2 If warranted by special circumstances or the student is elite athlete, entrepreneur or a chairman for an organisation under the Danish Youth Council (DUF), the Academic Study Board may grant dispensation from the rules on the maximum study period.

▼ § 7.3 - Study activity

7.4.1 **Minimum Pass Grade Requirement:** A student must pass at least one ECTS qualifying examination during a coherent period of at least one year. Should this requirement not be fulfilled, the student's enrolment will be cancelled.

7.4.2 If warranted by special circumstances, the Academic Study Board can grant dispensation from the minimum pass grade requirement.

7.4.3 **Activity requirement:** See SDU'S rules on student activity.

7.4.4 If warranted by special circumstances or the student is elite athlete, entrepreneur or a chairman for an organisation under the Danish Youth Council (DUF), the Academic Study Board can grant dispensation from SDU's rules on student activity.

▼ § 7.4 - Master's thesis

7.6.1 The Master's thesis accounts for 30 ECTS or 40 ECTS points and is a major independent written assignment which is included in the final year of a Master's programme. For students admitted on the 4+4 Ph.D programme, the thesis constitutes 45 ECTS points.

7.6.2 The thesis may be written individually or jointly by two students. The relevant Head of Programme may permit joint completion of a Master's Thesis project by up to three students.

7.6.3 The thesis must document the student's competences in using scientific theory and methodology in the work with a clearly defined academic subject. The subject of the thesis must be agreed with an academic supervisor.

7.6.4 A 30 ECTS thesis must be completed in the course of four months, whereas a 40 ECTS thesis must be completed in the course of two full semesters. As a rule, the starting date and deadline for submission of the thesis are the first workday in September, and the month of January, respectively, for theses to be completed in the autumn semester, and the first workday in February, and the month of June, respectively for theses to be completed in the spring semester. In extraordinary circumstances, the Academic Study Board may grant dispensation from the above dates/deadlines.

7.6.5 The Contract for the Master's thesis must be approved by the academic supervisor, the Head of Programme and the director of studies. A Contract for the Master's Thesis project approved by all the instances mentioned above, may be amended only if dispensation to do so has been granted by the Academic Study Board. Title changes, which do not lead to a delay in the submission date, are approved by the academic supervisor.

7.6.6 The deadline for submission of the thesis is binding. If the student fails to submit the thesis report within the set deadline, the student loses one examination attempt and the student must enter into a supplementary contract within two weeks of the original submission date. The deadline will be extended by three months from this date, and the formulation of the assignment will be extended by additional deliverables corresponding to three months' work within the original subject area. The deadline can be extended by a further three months, subject to the same conditions. Every time a deadline for submission is exceeded, this will be registered as a used examination attempt.

7.6.7 A Master's thesis contract which has been approved by the Head of Studies cannot be cancelled. If a student does not pass his or her thesis examination, the student is under obligation to enter into a supplementary contract within two weeks of the original examination date. The supplementary contract means that the student shall extend the formulation of the assignment by additional deliverables corresponding to three months' work within the original subject area. The student is given three months to prepare the thesis after which a new examination will be held.

7.6.8 In situations when it has not been possible to carry out lab experiments or when collaboration with a company fails, a company goes bankrupt or there are serious problems with empirical data or method selections, etc., the Academic Study Board can decide that the student shall write a new thesis with a new topic and deadline corresponding to the scope of the thesis. See 7.6.4.

7.6.9 The Master's thesis must include an abstract in a foreign language. The course description specifies which language the abstract must be written in. If the thesis is written in a foreign language, the abstract may be written in Danish. The abstract forms part of the assessment of the thesis.

7.6.10 The specific provisions on the Master's thesis are laid down in the course description.

▼ § 7.5 - Change of profile

7.9.1 The Academic Study Board may grant dispensation to change of profile/specialisation. Students are not permitted to extend their total standard study period if they change profile/specialisation course.

▼ § 7.6 - The Master's Degree part of the 4+4 PhD programme

7.10.1 Prior to the enrolment on the PhD programme, the student must be enrolled under a Master of Engineering study programme at the University of Southern Denmark and have passed 60 ECTS (the first two semesters) of the Master's programme. The remaining 60 ECTS consist of:

- constituent (obligatory) courses on the 3rd semester of the relevant Master's study programme corresponding to 15 ECTS points
- Master's Thesis on 45 ECTS points (see 7.6 for further information about the Thesis).

7.10.2 The student must have completed the Master's programme within three years of commencing the Master's programme.

▼ § 7.7 - Individual activities

Individual Study Activities

7.11.1 Students may in agreement with a supervisor apply to the Academic Study Board for an individual study activity.

7.11.2 Individual study activities shall include a description of the learning outcomes in terms of knowledge, skills, competencies and assessment method.

7.11.3 An individual study activity may not be used to reduce the scope of the study programme and it may not overlap with the contents of the Master's Thesis.

7.11.4 As a general rule, the extent of an individual study activity may not exceed 5 ECTS points. The Academic Study Board can, under special circumstances, make an exception to this rule.

7.11.5 Individual study activities completed in the autumn semester and which do not form part of the curriculum and which are to be included in the student's pool of electives, must have been approved by the Academic Study Board no later than at the Study Board's meeting in August. Likewise, individual study activities completed in the spring semester and which do not form part of the curriculum and which are to be included in the student's pool of electives, must have been approved by the Academic Study Board no later than at the Study Board's meeting in January.

7.11.6 Individual study activities completed in the autumn semester and which do not form part of the curriculum and which are to be included in the student's constituent courses must have been approved by the Academic Study Board no later than at the Study Board's meeting in April. Likewise, individual study activities completed in the spring semester and which do not form part of the curriculum and which are to be included in the student's constituent courses must have been approved by the Academic Study Board no later than at the Study Board's meeting in November. As a general rule, individual study activities can only substitute obligatory courses in situations, where the obligatory course in question no longer is offered, the student has not used examination attempts in the course in question, and it is not possible to take an equivalent course (pre-approval of credit transfer).

▼ § 7.8 - Limitation on the number of entries

7.13.1 The university may introduce restrictions on the choice of modules and on the choice of subjects for the project assignments. The university applies academic criteria as selection criteria if there is a limited number of places on a subject. If setting academic criteria is not possible, the university may use a draw as a selection criterion.

▼ § 8 - Exemptions and procedures

▼ § 8.1 - Dispensation from University regulations

8.1.1 When warranted by extraordinary circumstances, the Academic Study Board may grant dispensations from those rules of the Curriculum which have been laid down exclusively by the institution. In certain situations, where the student is elite athlete, entrepreneur or a chairman for an organisation under the Danish Youth Council (DUF), the Academic Study Board may grant a dispensation from the curriculum or the rules of SDU. The Academic Study Board may, apart from when deciding upon extra examination attempts, consider the academic ability of the student in question.

8.1.2 Any application for dispensation from the rules of the Curriculum must be made in writing, must be reasoned, and must be accompanied by relevant documentation. Costs related to acquiring such documentation shall be borne by the student. The Academic Study Board must have received the complete application no later than eight days prior to the meeting during which the application is to be processed.

▼ § 8.2 - Complaints over exams

8.2.1 The student is entitled to complain about an examination or other evaluation that is a constituent part of the examination. Complaints may

- be procedural (i.e. concerning whether the matter has been handled in accordance with applicable law and general principles of administrative law), or
- relate to the basis of examination,
- relate to the examination procedure and/or
- relate to the assessment of the examination

and must be submitted by the student to the university no later than 14 days after publication of the examination result. The complaint must be in writing. The complaint must be addressed to the Faculty of Engineering's Secretariat and sent to tek@tek.sdu.dk.

8.2.2 The university will decide on the complaint based on the assessors' professional opinion and the complainant's comments on the result. The decision may offer a reassessment or a re-examination, or may find against the complainant. A re-assessment or re-examination could result in a lower grade. Complaints cannot be made about examination basis, examination procedures or assessment related to the study start examination.

▼ § 8.3 - Complaints over University decisions

Appeals regarding procedural matters

8.3.1 The student is entitled to file a procedural appeal (i.e. concerning whether the matter has been handled in accordance with applicable law and general principles of administrative law) against the university's decisions, including decisions made by the Academic Study Board. Procedural appeals may be submitted to the Danish Agency for Science and Higher Education.

8.3.2 The appeal must be submitted to the University no later than 14 days after the student has been notified of the contested decision. The complaint must be in writing. The appeal must be addressed to the secretariat of the Academic Study Board at the Faculty of Engineering and sent to studienaevn@tek.sdu.dk.

Complaints about credit transfers and pre-approved credit transfers

Academic issues

8.3.3 Complaints about academic issues (ie. whether the qualifications the student has/would acquire can substitute parts of the study programme in question) in connection with the refusal or partial refusal of

- pre-approved credit transfers for Danish or foreign course elements, and
- credit transfers for Danish and foreign course elements that have been passed

can be submitted to a credit transfer Appeals board in accordance with the rules on Appeals boards for decisions regarding credit transfers for university programmes (the ministerial order on credit transfer appeals boards). The complaint must be submitted to the University no later than 14 days after the student has been notified of the contested decision. The complaint must be in writing and include an explanation of the reasons for the appeal. The complaint must be addressed to the secretariat of the Academic Study Board at the Faculty of Engineering and sent to studienaevn@tek.sdu.dk.

Judicial issues

8.3.4 Complaints about judicial issues (ie. whether the case has been processed in agreement with existing laws and general principles of administrative law) in connection with the refusal or partial refusal of

- pre-approved credit transfers for Danish or foreign course elements, and
- credit transfers for Danish and foreign course elements that have been passed

can be submitted to the Vice-Chancellor's Secretariat in accordance with the rules on Appeals boards for decisions regarding credit transfers for university programmes (the ministerial order on credit transfer appeals boards). The complaint must be submitted to the University no later than 14 days after the student has been notified of the contested decision. The complaint must be in writing and include an explanation of the reasons for the appeal. The complaint must be addressed to the secretariat of the Academic Study Board at the Faculty of Engineering and sent to studienaevn@tek.sdu.dk.

▼ § 9 - The affiliation of the programme

▼ § 9 - Transitions

9.1 The rules concerning maximum period of study, which were valid at the time of admission and enrolment, apply on students admitted and enrolled on a Master's study programme before 1 September 2015. I.e. these students must have completed the study programme within 3 years from the commencement of studies.

9.2 The rules concerning the study start examination and SDU's activity requirement do not apply on students admitted and enrolled on the Master's study programme before 1 September 2015.

▼ § 9.1 - Legal basis

This Curriculum was prepared on the basis of the authority granted by the provisions of:

- Danish Constitutional Act no. 778 of 7 August 2019 concerning the Danish Act on Universities (Universitetsloven)
- Danish Ministerial Order no. 106 of 12 February 2018 on Admission and Enrolment on Master's Programmes at Universities and Institutions in Architecture and Art within the area of Ministry of Higher Education and Science, as amended by the Ministerial Orders no. 257 of 19 March 2019, no. 639 of 25 June 2019 and no. 891 of 26 August 2019 (Kandidatadgangsbekendtgørelsen)
- Danish Ministerial Order no. 1328 of 15 November 2016 on bachelor and master's programmes (candidatus) at universities as amended by the Ministerial orders no. 902 of 27 June 2017, no. 258 of 19 March 2019 and no. 876 of 26. August 2019 (Uddannelsesbekendtgørelsen)
- Danish Ministerial Order no. 1062 of 30 June 2016 on University Examinations and Grading as amended by the Ministerial orders no 1503 of 28 November 2017, no 1080 of 28 August 2018 and no. 878 af 26 August 2019 (Eksamensbekendtgørelsen)
- Danish Ministerial Order no. 114 of 3 February 2015 on the Grading Scale and Other Forms of Assessment under the Danish Ministry of Higher Education and Science (Karakterbekendtgørelsen)
- Danish Ministerial Order no 1517 of 16 December 2013 on Credit Transfer Appeals Boards, as amended by the Ministerial order no. 880 of 26 August 2019 (Meritankenævnsbekendtgørelsen)
- Danish Ministerial Order no 597 of 8 March 2015 on Talent Initiatives on Higher Education within the area of Ministry of Higher Education and Science, as amended by the Ministerial order no. 892 af 26 August 2019 (Talentbekendtgørelsen)

▼ § 9.2 - Academic Study Board

Academic Study Board of the Faculty of Engineering

▼ § 9.4 - Effective date

01-09-2019

▼ § 9.5 - Date of Study Board Approval

16-09-2019

▼ § 9.6 - Date of Deans Approval

16-09-2019