

The Curriculum for Bachelor of Science in Engineering (Electronics)

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Academic Study Board of the Faculty of Engineering

Programme titles:

- Bachelor i Electronics
- Bachelor of Science in Engineering (Electronics)

ECTS value: 180

Cities: Soenderborg

Semesters: Autumn

Effective date: 01-09-2020

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 Bachelor programme is to

- introduce the student to the scientific disciplines of the academic area, including the theory and methodology of the area, to provide the student with a broad professional insight and comprehensive skills,
- provide the student with the professional knowledge and the theoretical and methodical qualifications to enable him or her to independently identify, formulate and solve complex problems within the relevant constituent disciplines of the academic area,
- provide the student with the basis for performing vocational functions and qualify for admission to a Master's programme.

The Bachelor programme is an independent, complete programme which is planned to guarantee academic coherence and progression. Thanks to the structure of the programme, the student will be able to choose between a number of Master's programmes or complete his/her Bachelor programme after attaining professional skills of immediate value on the labour market.

The Bachelor programme is full-time programme rated at 180 ECTS points, corresponding to the work of a full-time student for 34 months; for programmes starting in the spring semester, however, the duration is 36 months. The programme consists of constituent components, other mandatory components, including supporting subjects, and includes the scientific theory of the academic area, elective courses as well as a Bachelor project.

▼ § 1.3 - Didactic and pedagogical basis

The Engineering Education Model of the University of Southern Denmark

The Bachelor and Master programmes within the educational main 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 education 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.

Below is shown a summary of the main points of the education concept - the complete description of DSMI is available in electronic form at the website of the Faculty of Engineering.

Content and Skills

- 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 at 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 aim to facilitate the students' development towards being able to accomplish assignments in international contexts. Throughout their studies, the students work in an environment with international lecturers and scientists as well as international fellow students, and in the course of their studies, they are also required to participate in dedicated project groups working across linguistic and cultural boundaries. The programme structure is designed to support studies abroad.
- To enhance the graduates' labour market value immediately after graduation, the programmes intercorporate a high level of business relevance, ensured mainly via collaboration with external companies. These activities guarantee that the students' professional skills are put to regular use in a concrete, contemporary context.
- All students are encouraged to think and practice entrepreneurship - specifically through the corporate and business understanding integrated in the programme - and more generally through a learning and evaluation environment designed to stimulate student enterprise, creativity and responsibility.
- In the course of their studies, all students with at least once collaborate with students from other engineering disciplines or other educational programmes on the solution of a complex, interdisciplinary problem in close collaboration with an external organisation. This interdisciplinary collaboration is organised on the basis of a principle of 'experts in teams'

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 the 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 practice 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 teaching 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.

▼ § 3 - Detailed programme specific information

▼ § 3 - Programme title and profiles

▼ BSc in Engineering (Electronics) 2018

Name

BSc in Engineering (Electronics) 2018

Competence profile

The aim for the Bachelor of Science in Engineering study programme in Electronics is to provide the students with specific competencies in different disciplines including the interplay between different technologies and project work. The study programme educates the students to carry out, participate in or lead the development of industrial electronic products.

The study programme is divided into three parts; - one constituent part covering the generic topics of the programme (mainly semester projects, mathematics and physics), one constituent part covering the specific electronics subjects (mainly analog- and digital electronics and technology subjects) and one part covering elective courses, giving the possibility of specialization. The Electronic engineer acquires his/her competencies by working with subjects from all three parts.

The programme is partitioned into:

- Theoretical foundation in mathematics/physics/dynamics/technologies and scientific methods: Covers core competencies for all electronic students. The courses are mandatory and constituent.
- Electronics engineering: Covers courses and project work that specializes into the competency of developing industrial electronics. The courses are mandatory and constituent.
- Elective courses: Covers courses and project work that specializes according to the students individual interests in the context of industrial trends.

A Bachelor of Science in Engineering degree in Electronic Engineering provides the following competencies

Knowledge:

- A1. Research based knowledge of theory, methods and practice used to develop electronic components and systems for industrial electronic products.
- B1. Research based knowledge of theory, methods and practice used to develop analog and power electronic circuits and systems.
- C1. Research based knowledge of theory, methods and practice used to develop embedded solutions, both hardware and software, for industrial products.
- D1. The ability to understand and reflect on theories, scientific methods and practice in the interplay between technologies in the context of developing industrial electronic systems and products.

Skills:

- A1. The ability to apply the scientific and engineering methods and use state-of-the-art tools in the process of developing electronic systems and products.
- B1. The ability to analyze, specify and develop control- and signal processing systems in an electronic context.
- C1. The ability to analyze, specify and develop analog electronic circuits, including power electronic circuits, for industrial products.
- D1. The ability to analyze, specify and develop embedded hardware and software in the context of industrial products.
- E1. The ability to evaluate theoretical and practical issues in the electronic development process, as well as to explain and choose the optimum solution methods and technologies suited to solve a given electronic development task.
- F1. The ability to document, present and communicate engineering issues and solution models to both peers and non- specialists.

Competencies:

- A1. The ability to handle complex and development oriented situations in study or work contexts as an expert in an international engineering context.
- B1. The ability to independently participate in product development projects and interdisciplinary collaboration with a professional engineering approach with focus on industrial electronic solutions.
- C1. The ability to independently take responsibility and identify one's own learning needs and organize one's own learning in different learning environments.
- D1. The ability to continue studying on a relevant Master of Science programme at SDU or other universities.

Professional competence

The Electronic study programme provides a broad foundation of knowledge in the fields of analog and digital industrial electronics and embedded systems. The programme qualifies for jobs as an electronic engineer in Danish and international organizations. Typically, the electronic engineer will work with development of industrial electronics in companies that develops and produces components, products and systems based on analog-, digital- electronics and embedded software. The competencies of the electronic engineer can be utilized in many contexts – like automation, autonomous systems (robots), industrial production facilities or the mechatronics industry.

The programme focuses on product development. This primarily provides employment opportunities with companies that develop and sell products. The broad general knowledge given in the programme enables the electronic engineer to practice a variety of functions in the company. Typical job profiles are as follows:

- Research & Development Engineer
- Project Management
- Customer consultancy
- Project Sales
- Teaching

Typically, electronic engineers will begin their careers as research and development engineers. Within a few years, they will have the opportunity to combine technical work with management functions. Engineers are often involved in cross-organizational development processes, as well as being involved in partnerships with external companies, both nationally and internationally. Alternatively, they may develop into specialists in particular technologies, or perhaps start their own business.

The bachelor programme in electronics provides an immediate opportunity to continue on an MSc in Engineering degree in electronics or a corresponding master programme at the University of Southern Denmark (SDU) or another university.

Programme structure

Semester 6 30 ECTS	<u>Bachelor Project</u> T340039401 (15 ects)		<u>Sensors and Actuators</u> T370005401 (5 ects)	<u>Applied Electro Magnetics</u> T340037401 (5 ects)	(5 ects)
Semester 5 30 ECTS ↑	<u>Expert in Teams</u> T340059401 (10 ects)	<u>Project Management and Theory of Science for Engineers</u> T340058401 (5 ects)	<u>Power Electronics</u> T370003401 (5 ects)	<u>High Frequency Communication</u> T340049401 (5 ects)	(5 ects)
Semester 4 30 ECTS	<u>Design of Embedded Architectures</u> T370001401 (10 ects)	<u>Digital Signal Processing</u> T340047401 (5 ects)	<u>Digital Design and Signal Processing</u> T340052401 (5 ects)	<u>Control Engineering 2</u> T340038401 (5 ects)	(5 ects)
Semester 3 30 ECTS	<u>Develop Intelligent Dynamic Electronic Systems</u> T370015401 (20 ects)			<u>Electrodynamics and Mathematics</u> T340030401 (10 ects)	
Semester 2 30 ECTS	<u>Build Industrial Electronics</u> T370000401 (20 ects)			<u>Signals, Filters and Mathematics</u> T370004401 (10 ects)	
Semester 1 30 ECTS	<u>Discover the Electronic Development Process</u> T370007401 (20 ects)			<u>Physics and Mathematics</u> T370006401 (10 ects)	

- = 1st year test
- = Elective

Explanatory comments to programme structure

1. Workshop training is included during the first year. The workshop training is mandatory and assessed on a pass / fail basis.
2. Students are encouraged to complete the 5th 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 competencies of the electronic engineer are built around students working on topics from five subject columns:

- Course of theoretical foundation, control and mathematical/physical modelling;
- Development of industrial analog electronic – practical and theoretical;
- Development of digital and embedded electronics – practical and theoretical;
- Methods and personal learning; and
- Specialization via electives and the bachelor thesis

The academic topics are interlinked during the individual semesters by semester themes. Throughout the course of study, students continually acquire the necessary academic knowledge, while at the same time gaining personal competencies. The columns include the following subjects and disciplines:

The theoretical foundation, control and mathematical/physical modelling

Consists of the academic fields: MATH1, ENPHYS, MATH2, MSS, EDY, CON, MC-COE2, with the following principal content:

MATH1: Integration techniques; Differentiation techniques; Taylor and Maclaurin series; Functions of several variables; Differential equations; Vectors and matrices.

ENPHYS: Basic physical systems; Newtons 3 laws; Strategies to solve static problems.

MATH2: Complex numbers; Laplace transformation; Fourier series; Data handling. MSS: Further Laplace Transforms; Z-transform; Vector Calculus; Numerical analysis. EDY: Trigonometrical functions; Electrical fields; Magnetic fields.

CON: Modelling of dynamic systems; Model of DC motor; Transient analysis and frequency analysis; Stability of closed loop systems; Dimensioning of lead-lag and PID compensation; Computer simulations with MATLAB.

MC-COE2: State equations in analogue and digital form; State-space controller; Controllability and observability; Controller for reference input; Integral controller.

Progression through this column enhances the student's ability to understand the underlying physical circumstances and to use the relevant mathematical models in an engineering context.

Development of industrial analog electronics - practical and theoretical

Consists principally of the academic fields: ELTR1, ELTR2, ASF, ELTR3, EE-SAA, EE-POE, MC-AEM, MC-HFC with the following principal content:

ELTR1: Basic electronic circuits; Basic passive components; transistors and diodes; circuit analysis; basic digital circuits.

ELTR2: Laplace transform; operational amplifiers, transfer functions; analog signal processing circuits with amplifiers;

ASF: Waveform generators; Active and passive analog filters and signal analysis; modelling and simulation of analog circuits; A/D and D/A conversion.

ELTR3: Fundamentals of electric machines, Fundamentals of drives, Three phase transformers and Three phase systems.

EE-SAA: Sensor characterization; Accuracy and error estimation; Basic understanding of semiconductor materials; Electromechanical, thermal, radiation and electromagnetic transducers; Simple actuators.

EE-POE: Power components and characteristics, converter topologies, Phased Locked Loops, Heatsink calculations, switching power electronics, EMI.

MC-AEM: Applied electromagnetics focusing on the solution of various electrical engineering and physical problems.

MC-HFC: RF circuit basic, two-port model, S-parameter, noise in transmission systems, Modulation theory basics (AM, FM, PM, etc.), Wave propagation, Antenna theory and design.

Progression through this column enhances the student's ability to use advanced theoretical methods and practical approaches in the process of analyzing, modelling and developing industrial analog electronic systems.

Development of digital and embedded electronics - practical and theoretical

Consists of the academic fields: EMB1, EMB2, MC-DSP, MC-DDS, EE-DEA, with the following principal content:

EMB1: Numbering systems; Programming in C, including: simple data types, control structures, functions, arrays, structs, pointers, bitwise operators, microcontroller systems.

EMB2: Logic components; Boolean algebra; Latches and flip-flops; State machines; Microcontroller hard- ware; Peripheral units; Interrupts.

MC-DSP: Discrete transforms; Z-transform; Convolution; Correlation; FIR and IIR filters.

MC-DDS: Design and Implementation of digital circuits in Field Programmable Gate Arrays (FPGA's), Design and development of digital circuits using VHDL.

EE-DEA: Design of a digital architecture in an FPGA SoC target technology, including real time signal processing algorithms.

Progression through this column enhances the student's ability to develop embedded software solutions, including implementation of digital signal processing algorithms in hardware components.

Methods and personal learning

Consists principally of the academic fields: SPRO1E, SPRO2E, SPRO3E, MC-EXS, MC-PMTS with the following themes and principal content:

SPRO1E: The Electronic Development Process. An introduction to the Electronic disciplines: concept, interdisciplinary and particular focus on the development process. An electronic product is designed by applying the different skills acquired during the semester.

SPRO2E: Build Industrial Electronics. An electronic product is built with focus on an industrial approach. The different subjects of the semester are the academic basis for the project.

SPRO3E: Develop Intelligent Dynamic Electronic Systems. The focus is on the development of an intelligent, dynamic electronic product using sensors and actuators. The different subjects of the semester and previous semesters are the academic basis for the project.

MC-EXS: Experts in Teams. The students will be challenged by a complex product development situation. They will work together in large teams in a project with many stakeholders where the ability to cooperate with different people (engineers and non-engineers) and the ability to organize the project as well as the ability to use one's own expertise is a "must" to achieve a satisfying result.

PMTS: Project Management and Theory of Sciences. The students will learn to understand the managerial tasks related to project deliveries in organizations and about the nature of science, the scientific method and the various forms of logical reasoning

Progression through the projects students enhance and develop personal and learning competencies, while at the same time the academic competencies are learned in depth and brought to maturity in "real" projects, thus giving personal competencies in the areas of: Commitment, Initiative, Responsibility, Ethics, Establishment, Ability to put personal learning into perspective and learning competencies in the area of: Analysis and assessment of data material; Communication of working results using approaches that require reflection, cooperation and independency.

Specialization via electives and the bachelor thesis.

Further focusing of competencies may be done by choosing electives in the fourth, fifth and sixth semesters (20 ECTS points in total) and via chose of subject for the bachelor thesis. The courses will be in the domain of the MCI research e.g.: Micro- and Nanotechnology, Modelling and Control of Industrial Systems, Embedded Systems, Industrial Electronics, Power Electronics or Mechatronics.

Description of first semester

SEMESTER THEME

The theme for the first semester is 'Discover the Electronic Development Process'.

VALUE ARGUMENTATION

It is important for new students to gain an insight into what electronics is, as well as an understanding of how the development of electronic products may proceed, as this will later enable them to understand and make use of the more complex concepts and skills required for the development of industrial electronic products.

During the project work this semester, students will experiment with the design of basic electronic elements through lab exercises and they will develop a small electronic product. They will be guided through all the phases of the development process. This will enable students to gain a general knowledge of the individual disciplines, the interdisciplinary nature of the work, and the process involved, thus providing them with an overview of what electronics is. The project is supported by the semester courses in electronics and embedded systems, as well as the associated Physics and Mathematics.

COMPETENCE GOALS

Students will be able to:

- Explain and use a structured, phased product development model for the development of an electronic product from idea, concept, outline, choice of components to a functioning prototype;
- Design, test and document simple electronic circuits using relevant tools and methods;
- Write software that is able to register input from the surroundings, process this and send control information back to the environment using an existing hardware platform; and
- Understand the mathematical and physical basis of simple electronic systems.

SEMESTER STRUCTURE

EE-DEDP – Discover the Electronic Development Process (20 ECTS)

EE-PHYM – Physics and Mathematics (10 ECTS)

The modules are compulsory and part of the first-year exam.

CONTEXT

The semester includes two modules: EE-DEDP (Discover the Electronic Development Process) and EE- PHYM (Physics and Mathematics). The EE-DEDP module contains a semester project (SPRO1E – 10 ECTS) of the same title as the semester theme, as well as two supporting academic fields. Overall, this forms an introduction to the concept of electronics and its associated core skills. The two academic fields are: ELTR1 – 5 ECTS: Basic Electronics; and EMB1 – 5 ECTS: Embedded Hardware/Software. The EE-PHYM module contains two academic fields: ENPHYS – 5 ECTS: Electro Physics and MATH1 – 5 ECTS: Calculus and Matrix Algebra.

Description of second semester

SEMESTER THEME

The theme for the second semester is 'Build Industrial Electronics'.

VALUE ARGUMENTATION

In relation to the development of electronic products, it is important for students to have both knowledge and understanding of the system in general and knowledge of the system components and their interaction. Furthermore, it is very important for the students to have knowledge and competencies for the interpretation of Industrial electronics and how the required quality of industrial products can be achieved.

This semester introduces "Industrial Electronics" and builds up experience in the construction of systems with industrial requirements. In addition, students learn how to design electronic elements, as well as how to manufacture and apply them in a system context. This approach takes the form of a semester project in which the theme of the semester is central: the construction of industrial electronics. The project is backed up by the other academic fields of the semester, which provides an insight into the technology and the physical/mathematical foundation.

COMPETENCE GOALS

Students will be able to:

- Design analog electronics in an industrial context;
- Build digital electronics;
- Integrate analog electronics, digital electronics and software into an overall functioning system with some analog signal processing; and
- Analyze the dynamics of electronic products

SEMESTER STRUCTURE

EE-BIE – Build Industrial Electronics (20 ECTS)

EE-SFMAT – Signals Filters and Mathematics (10 ECTS)

Both modules are compulsory. Together with the first semester, EE-BIE constitutes the first-year exam.

CONTEXT

The semester includes two modules: EE-BIE (Build Industrial Electronics) and EE-SFMAT (Signals, Filters and Mathematics). EE-BIE focuses particularly on the theme of the semester, thus in the semester project (SPRO2E - 10 ECTS) an electronic system is to be built. The two associated academic fields, ELTR2 - 5 ECTS and EMB2 - 5 ECTS, provides an insight into the development of analog electronics and the design of digital electronics, while the semester project utilizes this in a practical solution.

Including the competencies attained in the first semester, students will thus be able to build a complete electronics system including both digital and analog elements.

The module EE-SFMAT (Signals, Filters and Mathematics) provides the theoretical background to the semester, particularly the theoretical angle in terms of the associated filter theory, mathematics and physics. This includes the academic fields ASF - 5 ECTS and MATH2 - 5 ECTS.

Description of third semester

SEMESTER THEME

The theme of the third semester is "Develop Intelligent Dynamic Electronic Systems"

VALUE ARGUMENTATION

From the first two semesters, students have attained a fundamental knowledge of electronics and the corresponding development process. Furthermore they have learned how to design basic electronic circuits - both digital and analog - including basic embedded programming.

In this semester, it is important for students to attain a more professional approach to the development of industrial electronics. This is achieved by teaching students in the subjects of advanced analog electronics and control engineering for dynamic systems. A project is completed in which the students' development efforts are focused on the application of using sensors and controlling actuators, the design of electronics and the specification and test of such a system, thus enabling the development of a complete electronic product. Students gain an insight into the interaction between the various subjects, including the dynamic conditions within systems.

COMPETENCE GOALS

In the third semester, students attain the following academic competencies:

- The ability to analyze, specify and design advanced analog electronic circuits;
- An understanding of the basic principles in actuators and sensors, and an ability to use these as components in the development of products and systems;
- An insight into, and understanding of, the interaction between sensors, actuators and electronics;
- The ability to understand and model dynamic problems in connection with electronic systems; and
- The ability to specify, design and develop electronic products, in which an external system is controlled by an analog electronic system that is central to the functionality;

SEMESTER STRUCTURE

EE-DIE - Develop Intelligent Dynamic Electronic Systems (20 ECTS)

MC-EDM - Electrodynamics and Mathematics (10 ECTS)

Both modules are compulsory.

CONTEXT

The semester consists of two modules, EE-DIE (Develop Intelligent Dynamic Electronic Systems) and MC-EDM (Electrodynamics and Mathematics).

In MC-DIE, students complete a semester project (SPRO3E - 10 ECTS) that deals with the development of a dynamic electronic system, in which the electronics, control algorithms and software must be developed, while the external components (eg. sensors and actuators) are provided. The accompanying teaching deals in particular with the development of electronics as well as control theory in the academic fields ELTR3 - 5 ECTS and CON - 5 ECTS.

In MC-EDM, the focus is on the theoretical aspect of dynamic mechanical systems and the modelling of electro technical systems in the academic fields EDY - 5 ECTS and signal processing in the academic field MSS- 5 ECTS.

Description of fourth semester

SEMESTER THEME

The theme of the fourth semester is "Design of Embedded Architectures"

VALUE ARGUMENTATION

In the fourth semester, the focus is on designing advanced digital hardware architectures and algorithms in Field Programmable Gate Arrays and using the corresponding modelling tools and methods. This also includes the use of control- and signal processing theory in an electronic design. The students will hereby gain insight into the technologies, methods and possibilities of the "embedded world" - as a mayor part of the "electronics world". The semester is consolidated by courses in control theory and digital signal processing which form a significant theoretical foundation for the development of advanced industrial electronic systems. Students must also choose an elective course on this semester.

COMPETENCE GOALS

In the fourth semester, students attain the following academic competencies:

- The ability to design digital hardware solutions using FPGA's;
- The ability to design digital filters and other digital signal processing algorithms for real time solutions;
- The ability to model a control system in the context of an electronic system; and
- Further specialization through the choice of an elective course;

SEMESTER STRUCTURE

EE-DEA - Design of Embedded Architectures (10 ECTS)

MC-DSP - Digital Signal Processing (5ECTS)

MC-DDS - Digital Design and Signal Processing (5ECTS)

MC-COE2 - Control Engineering (5 ECTS)

The above modules are compulsory. In addition, one elective course equivalent to 5 ECTS must be chosen.

CONTEXT

The semester consists of five modules, EE-DEA (Design Embedded Architectures), MC-DSP (Digital Signal Processing), MC-DDS (Digital Design and Signal Processing), MC-COE2 (Control Engineering) and one elective course.

EE-DEA consists of a semester project (10 ECTS) where the focus is development of a digital system using a Field Programmable Gate Array (FPGA) System on Chip (SoC) component for the target technology. The project will train the students in using advanced tools for modelling, design, synthesis and validation of real time hardware based signal processing

In MC-DSP teaching is provided in Digital Signal Processing theory - a necessary theoretical foundation that will support the development of advanced electronic products.

The module MC-DDS will provide the basic knowledge and training in developing of hardware for FPGA's and the ability to use the corresponding tools.

The module MC-COE2 (Control Engineering) adds competencies in developing control systems thus giving the possibility of finalizing the project work including the necessary control part.

Description of fifth semester

SEMESTER THEME

The theme of the fifth semester is Experts in Teams

VALUE ARGUMENTATION

In this semester, all the knowledge, skills and competencies gained from the previous four semesters are activated, put into practice and further developed in the context of: Each student being an expert playing his/her particular role in the development of a bigger "real world" project with many stakeholders. The idea of the theme is:

Students will gain experience of the completion of project work in a context of 'innovation and entrepreneurship'. The work of the project is organized into a virtual company, and students must complete all phases of development from the idea to the building of a fully functional prototype, taking into account finance, external suppliers, etc.

In addition, the semester includes a course in Power Electronics and two elective courses, in which students can consolidate their knowledge, skills and competencies and thus become specialists - or in other words: become 'experts in the team'.

COMPETENCE GOALS

In the fifth semester, students attain the following academic competencies:

- Experience of project management, the construction of the required organization and financial management of a project;
- Knowledge of how to collaborate on a major project requiring different skills;
- The ability to understand their own roles in the work of the project;
- An understanding of the philosophical aspects of science;
- Theoretical ballast in Power Electronics added to the electronics competencies; and
- The attainment of further specialization of two elective courses;

SEMESTER STRUCTURE

MC-EXS - Experts in Teams (10 ECTS)

MC-PMTS - Project Management and Theory of Sciences (5 ECTS)

EE-POE - Power Electronics (5 ECTS)

MC-HFC - High Frequency Communication (5 ECTS)

The above modules are compulsory. In addition, an elective course equivalent to 5 ECTS must be chosen

CONTEXT

The semester consists of five modules.

MC-EXS: Experts in teams is a technical project characterized by a high degree of completion. The supervisors will present a project from an external or internal stake holder. The project must represent a problem requiring innovation and investigation of state-of-the-art research- and development experiences within the topic. The students will organize in a company-like structure - dealing with all, for the project, necessary roles (product development phases, project management, purchasing, budgeting etc.). As an expert-in-team, the individual student is given the possibility of focusing on specific disciplines from his/her study programme during the project work.

MC-PMTS: The overall aim of the project management part of the course is that students understand the challenges and managerial tasks related to project deliveries in organizations and are capable of setting up a plan for executing a project. In theory of Sciences, students will learn about the scientific method and the various forms of logical reasoning among other different philosophical interpretations and definitions of science.

The Modules EE-POE and MC-HFC adds further competencies in electronic systems.

EXCHANGE POSSIBILITIES

The faculty recommends and supports, that students go for a one semester exchange at another university. On the electronics bachelor programme the 5th semester can be used for this purpose. The Experts in Teams module (MC-EXS - 10 ECTS) and the elective course (5 ECTS) can be exchanged to elective courses at our partner universities - preferable including some project work. The remaining courses (EE-POE - 5 ECTS, MC-HFC - 5 ECTS, MC-PMTS - 5 ECTS) can be exchanged with relevant courses with a majority of the same topics. The exchange programme must be approved by the faculty study board.

Description of sixth semester

SEMESTER THEME

The theme of the sixth semester is the Bachelor project.

VALUE ARGUMENTATION

The focus of the semester is on students demonstrating an overall view, independence and mastering of the core skills taught in the study programme. This is documented in the Bachelor project. The semester is supplemented by two advanced modules: MC-SAA (Sensors and Actuators) and MC-AEM (Applied Electromagnetics) as well as an elective course. This provides students with theoretical insight that can be applied to the bachelor project and is a prerequisite for any further studies.

COMPETENCE GOALS

Students gain:

- The application and understanding of the physics and use of advanced sensors and actuators;
- Knowledge of numerical methods for the resolution of electro physical problems;
- Specialized knowledge through the selection of an elective course; and
- The ability to complete a Bachelor project by making use of the core skills taught in the study programme;

SEMESTER STRUCTURE

MC-BPRO - Bachelor Project (15 ECTS)

MC-SAA - Sensors and Actuators (5 ECTS)

MC-AEM - Applied Electromagnetics (5 ECTS)

The above modules are compulsory. In addition, an elective course equivalent to 5 ECTS must be chosen.

CONTEXT

The semester consists of three modules, the Bachelor project, a theory course in Sensors and Actuators - MC- SAA and Applied Electromagnetics - MC-AEM as well as an elective course worth 5 ECTS.

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

The module and academic fields on the first semester are organized in a way so they will adapt to the level of the incoming students according to the entry requirements for the programme.

The semester project (SPRO1E) introduces the field of electronics and the process of developing technology in team work based on the students entry level and on the supporting academic fields on the semester. The academic fields ELTR1 and EMB1 introduces methods and technologies to support the semester project

The academic fields in the module EE-PHYM builds upon the entry requirements, especially in relation to mathematics (A-level) and physics (B-level). For instance, this is evident in MATH1 where the student is introduced to further differentiation and integration techniques as well as studying differential equations more advanced as encountered in high school mathematics. In ENPHYS the concept of electromagnetics included in the entry requirements are developed in order to construct circuit models for magnetic circuits, including single-phase transformers, taking into consideration the linear or non-linear permeability of the core materials as well as the influence of flux fringing.

▼ § 4 - Course Descriptions

▼ § 4 - Compulsory courses

Profile divided course descriptions

BSc in Engineering (Electronics) 2018

Course descriptions in the curriculum

▼ Physics and Mathematics

▼ Course ID

T370006401

▼ Course Title

Physics and Mathematics

▼ ECTS value

10

▼ Internal Course Code

EE-PHYM

▼ Responsible study board

Academic Study Board of the Faculty of Engineering

▼ Discover the Electronic Development Process

▼ Course ID

T370007401

▼ Course Title

Discover the Electronic Development Process

▼ ECTS value

20

▼ Internal Course Code

EE-DEDP

▼ Responsible study board

Academic Study Board of the Faculty of Engineering

▼ Build Industrial Electronics

▼ Course ID

T370000401

▼ Course Title

Build Industrial Electronics

▼ ECTS value

20

▼ Internal Course Code

EE-BIE

▼ Responsible study board

Academic Study Board of the Faculty of Engineering

▼ Signals, Filters and Mathematics

▼ Course ID

T370004401

▼ Course Title

Signals, Filters and Mathematics

▼ ECTS value

10

▼ Internal Course Code

EE-SFMAT

▼ Responsible study board

Academic Study Board of the Faculty of Engineering

▼ Develop Intelligent Dynamic Electronic Systems

▼ Course ID

T370015401

▼ Course Title

Develop Intelligent Dynamic Electronic Systems

▼ ECTS value

20

▼ Internal Course Code

EE-DIE

▼ Responsible study board

Academic Study Board of the Faculty of Engineering

▼ Electrodynamics and Mathematics

▼ Course ID

T340030401

▼ Course Title

Electrodynamics and Mathematics

▼ ECTS value

10

▼ Internal Course Code

MC-EDM

▼ Responsible study board

Academic Study Board of the Faculty of Engineering

▼ Design of Embedded Architectures

▼ Course ID

T370001401

▼ Course Title

Design of Embedded Architectures

▼ ECTS value

10

▼ Internal Course Code

EE-DEA

▼ Responsible study board

Academic Study Board of the Faculty of Engineering

▼ Digital Design and Signal Processing

▼ Course ID

T340052401

▼ Course Title

Digital Design and Signal Processing

▼ ECTS value

5

▼ Internal Course Code

MC-DDS

▼ Responsible study board

Academic Study Board of the Faculty of Engineering

▼ Control Engineering 2

▼ Course ID

T340038401

▼ Course Title

Control Engineering 2

▼ ECTS value

5

▼ Internal Course Code

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Digital Signal Processing**

▼ **Course ID**

T340047401

▼ **Course Title**

Digital Signal Processing

▼ **ECTS value**

5

▼ **Internal Course Code**

MC-DSP

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Expert in Teams**

▼ **Course ID**

T340059401

▼ **Course Title**

Expert in Teams

▼ **ECTS value**

10

▼ **Internal Course Code**

MC-EXS

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **High Frequency Communication**

▼ **Course ID**

T340049401

▼ **Course Title**

High Frequency Communication

▼ **ECTS value**

5

▼ **Internal Course Code**

MC-HFC

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Power Electronics**

▼ **Course ID**

T370003401

▼ **Course Title**

Power Electronics

▼ **ECTS value**

5

▼ **Internal Course Code**

EE-POE

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Project Management and Theory of Science for Engineers**

▼ **Course ID**

T340058401

▼ **Course Title**

Project Management and Theory of Science for Engineers

▼ **ECTS value**

5

▼ **Internal Course Code**

MC-PMTS

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Applied Electro Magnetism**

▼ **Course ID**

T340037401

▼ **Course Title**

Applied Electro Magnetism

▼ ECTS value

5

▼ Internal Course Code

MC-AEM

▼ Responsible study board

Academic Study Board of the Faculty of Engineering

▼ Bachelor Project

▼ Course ID

T340039401

▼ Course Title

Bachelor Project

▼ ECTS value

15

▼ Internal Course Code

MC-BPRO

▼ Responsible study board

Academic Study Board of the Faculty of Engineering

▼ Sensors and Actuators

▼ Course ID

T370005401

▼ Course Title

Sensors and Actuators

▼ ECTS value

5

▼ Internal Course Code

EE-SAA

▼ 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 is either graded in accordance with the Danish 7-point grading scale, or is assessed as 'passed/failed' (bestået/ikke-bestået), or as 'approved/non-approved' (godkendt/ikke-godkendt). The Bachelor project 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. This does not apply to credit transfers from previous examinations.

5.1.4. When the assessment basis for a study activity is 'tuition attendance', this assessment is made by a teacher on the basis of criteria students are informed of at the beginning of the course. The condition for achieving the assessment 'approved' is that the student has achieved the objectives established for the course to such an extent that the assessment 'approved' or a grade of at least 2 would be given.

5.1.4.1 The basis for approval 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.

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

5.1.5 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 'approve' or 'non-approved'.

▼ § 5.2 - Special exams

5.2.0 Examinations Abroad

5.2.0.1 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.

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

5.2.0.3 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 Study start examination: Students accepted on the Bachelor programme 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 Study start test for students admitted in 2019:

- Attendance 2-6 September 2019 (all days).

5.2.1.3 Study start test for students admitted in 2018:

- MCQ test. The test must be passed no later than 7 September 2018.
- Attendance 3-7 september 2018 (all days).

5.2.1.4 Study start test for students admitted in 2017:

- Attendance 4-8 September 2017.
- Students in Odense: Attendance in the Faculty introductory lecture.

5.2.1.5 Students have two attempts to pass the study start examination.

- Reexam for students admitted in 2019 is held 9-13 September 2019. The reexam is based on attendance.
- Reexam for students enrolled in 2018 is held 10-14 September 2018. The reexam is based on attendance and MCQ-test.
- Reexam for students admitted in 2017 is held 11-15 September 2017. The reexam is based on attendance.

5.2.1.6 If warranted by special circumstances, the Academic Study Board may grant dispensation from the rules on the study start examination.

▼ § 5.2.2 - First year exam

5.2.2.1 Before the end of the first year of study, the student must take the test(s) which according to the Curriculum are constituent components of the first-year examination. The first-year examination must be passed in its entirety before the end of the first year of study after the commencement of studies, in order for the student to qualify for continuing his or her studies. This applies irrespective of whether or not the student has used his/her third examination attempt.

5.2.2.2 The first-year examination of the Bachelor of Science in Engineering programmes at the University of Southern Denmark consists of the courses of the first semester of the programme in question in their entirety and the project course in the second semester, with the exception of study programme of BSc (Eng) in Physics and Technology, where the first year examination consists of the courses on the 1st semester only. The detailed contents of the first-year examination are listed in the semester descriptions of the Curriculum and the course descriptions.

5.2.2.3 There is offered an examination in the 1st semester courses in the spring semester, before the ordinary examination in the project module in the 2nd semester. Students who have not passed the 1st semester courses in connection with the ordinary examination and/or the re-examination, can register for this examination with the aim of passing the first-year examination.

5.2.2.4 If warranted by extraordinary 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 first-year examination. It is a prerequisite for the participation in the 3rd semester courses on the bachelor programmes, that the student has passed the first year examination in its entirety.

▼ § 5.3 - Spelling and writing skills

5.3.1 The assessment of the Bachelor project 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 Bachelor project 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 dispensations 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 Higher Education. Internal examinations are assessed by one or more teachers appointed by the university from among its teachers.

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 Bachelor project, but does not apply to credits transferred from other examinations.

▼ § 5.5 - Exam language

5.5.1 For **study programmes offered in Danish up to and including 2nd semester**: The tuition and examination language is, as a basic rule, Danish. Examinations may be taken in Swedish or Norwegian instead of Danish.

5.5.2 For **study programmes offered in Danish up to and including 4th semester**: The tuition and examination language is, as a basic rule, Danish. Examinations may be taken in Swedish or Norwegian instead of Danish.

If individual courses are offered in Danish but taught in English by a lecturer, who speaks Danish, the examination language is the student's preferred language (Danish or English).

If individual courses are offered in Danish but taught in English by a lecturer, who does not speak Danish, the examination language is English.

5.5.3 For **study programmes offered in Danish, 5th-6th semesters** The courses are offered and taught in English. The examination language is English. The Academic Study Board may grant dispensation from this rule.

5.5.4 For **study programmes offered or taught in English**: The examination language is English. The Academic Study Board may grant dispensation from this rule.

▼ § 5.6 - Forms of assessment

Purpose

5.6.1 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 concerning Undergraduate and Postgraduate studies at Danish Universities (Uddannelsesbekendtgørelsen), the Curriculum and the respective semester plans. The final examination provides the basis for issuing a diploma.

Examination Forms

5.6.2 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 subject/subject element, and may include:

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

5.6.3 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 module description.

5.6.4 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

5.6.5 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 bachelor project.

Sound and/or Image Recordings

5.6.6 The use of sound and image recordings during 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

5.6.7 The use of examination aids is specified in the individual course descriptions and semester plans.

▼ § 5.7 - Irregularities at exams

Disciplinary Action

5.7.1 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. The Regulations of the University of Southern Denmark re. Disciplinary Measures.

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

Errors and Defects in an Examination

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

5.7.4 In cases of errors or defects or a particularly serious character, 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.

5.7.5 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

5.8.1 Students with physical or mental impairments, 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.

5.8.2 The deadline for applying 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 bachelor programme.

5.8.3 The diploma will not include any information on special examination conditions.

▼ § 5.9 - Ordinary exams

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

5.9.2 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

5.10.1 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.

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

5.10.3 Re-examinations are 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.

5.10.4 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.

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

5.10.6 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 final project, however, cannot be changed.

Consequences for not having passed an exam by 2nd attempt

5.10.7 If the student does not attend or pass the ordinary examination and/or the relevant re-exam, the student can register for the examination the next time the course is offered next time. The student must comply with the registration period.

5.10.8 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. The Academic Study Board can grant a dispensation from this rule.

▼ § 5.11 - Exam attempts

5.11.1 A passed examination cannot be retaken.

5.11.2 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. The first-year examination and the study start examinations constitute an exception to this rule.

5.11.3 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. This rule does not apply to the study start examination.

▼ § 5.12 - Requirements for exams

Failure to Meet Examination Requirements

5.12.1 If the student fails to fulfil the examination requirements this will count as one examination attempt. In extraordinary circumstances, the Academic Study Board can grant dispensation from this rule.

Absence from Examination Activities

5.12.2 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

5.12.3 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

5.13.1 Examinations are arranged as individual or group examinations.

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

5.13.3 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 bachelor project being an exception from this rule.

▼ § 6 - Credit transfer

▼ § 6.1 - Transfer of credit

6.1.1 The student must apply for credit transfer for course elements passed from all previous study programmes at Bachelor 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 for a semester, must have passed courses corresponding to at least 90 ECTS points on the respective bachelor study programme. Furthermore, the student exchange abroad 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 assessment of the academic qualifications of a student, the Academic Study Board may allow credits to be transferred from a previous higher education programme in Denmark or abroad.

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

6.3.2.1 Course elements which have been passed will only entitle the student to credit transfers in cases where such elements are at the same level as the study programme the student is enrolled in (Bachelor or Master's level).

6.3.3 Course elements whose contents coincide with the contents of constituent course elements of the study programme in question or with any already passed course elements in the present study programme cannot be approved as elective courses or entitle to credit transfers as elective courses in the study programme. Elective courses include all course elements approved by the Academic Study Board and that are not compulsory in the study programme in which the student is enrolled.

6.3.4 Credit transfers are only given upon production of an original, official transcript of records (hard copy) or a certified pdf-file, showing the passed study activities.

6.3.5 Transfer of study credits 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 passed 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 Admission to the study programme also implies admission to the first and second semester tuition and examination. Admission to tuition and examinations in the other semesters takes place electronically on Student Services Online at <https://sso.sdu.dk>.

7.1.2.2 The application periods are May for tuition during the autumn semester and November/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 subject or optional subject involves automatic registration for tuition and the associated ordinary examination. Registration for both compulsory subjects is binding. The Academic Study Board grant dispensation from this rule, provided that special circumstances apply. However, electives can be changed. See 7.1.4.

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

7.1.4 Students may change an optional subject if they have not attempted an examination in the subject for a different optional subject within the first three weeks of the start of the semester.

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 Students cannot register for courses beyond the level required to complete the study programme, unless the student in question is enrolled on one of SDU's talent programmes.

Course og 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 have applied for a dispensation for withdrawal before the exam is question is held.

▼ § 7.2 - Access to Masters level courses

7.2.1 Students, who are enrolled on a BSc (Eng) study programme at SDU, kan apply for a permission to follow courses on a MSc (Eng) programme, if the Academic Study Board judges that the student has academic prerequisites to pass the bachelor study programme and simultaneously follow courses on a Master's study programme.

7.2.1.1 The student must generally have passed all courses on 1-4 semesters of the bachelor's study programme at SDU. Furthermore, the student can, at a maximum, follow courses equivalent of 30 ECTS points pr. semester, including failed courses at bachelor level.

▼ § 7.3 - Deadline for programme completion

Maximum Study Period

7.3.1 The Bachelor programme must be completed no later than four years after the commencement of studies. See SDU's rules on completion times for Bachelor, Professional Bachelor and Master's (Candidatus) programmes. Granted leave of absence is not included in this time period.

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.

▼ § 7.4 - 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.

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

7.4.2 Activity requirement: See, SDU'S rules on student activity.

7.4.2.1 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.

▼ § 7.5 - Bachelors project

7.5.1 The Bachelor project is completed during the sixth semester of the programme. This serves to demonstrate the student's ability qualitatively to formulate, analyse and address problems within a specific academic discipline which reflects the main emphasis of the programme.

7.5.2 The Bachelor project may be completed individually or jointly by two students. The relevant Head of Programme may permit joint completion of a Bachelor project by up to three students.

7.5.3 The Bachelor project must be completed in the course of a semester. The starting date and delivery deadline for a project to be completed over the autumn semester are the first workday in September, and the month of January, respectively, and for a project to be completed over the spring semester, the starting date and delivery deadline are the first workday in February, and the month of June, respectively. In extraordinary circumstances, the Academic Study Board may grant dispensation from the established deadlines.

7.5.4 The Contract for the Bachelor project is approved by the academic supervisor and relevant Head of Programme . A registered Contract for the Bachelor project 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 of the project.

7.5.5 The deadline for submission specified in the Contract for the Bachelor project is binding, and failure to observe the deadline will cause the project to be considered failed, and the student must register for tuition in the following semester, sign a new Bachelor project contract and prepare a new bachelor project. A new project is defined as a new project description with a new title.

7.5.6 The Bachelor project must include an abstract written in a foreign language. The course description specifies which language the abstract must be written in. If the Bachelor project is written in a foreign language other than Norwegian or Swedish, the abstract may be written in Danish. The abstract forms part of the assessment of the Bachelor project.

▼ § 7.6 - Change of profile

7.9.1 If there are profiles/specialisations on the bachelor study programme, the Academic Study Board may grant dispensation to change of profile/specialisation. A change of profile/specialisation may not lead to a prologation of the total study time of the student.

▼ § 7.7 - Individual activities

Individual Study Activities

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

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

7.7.3 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 bachelor project.

7.7.4 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.

7.7.5 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 optional subjects 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 optional subjects must have been approved by the Academic Study Board no later than at the Study Board's meeting in January.

7.7.6 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 subjects 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 subjects 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 coursees in situations, where the obligatory course 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 complaints 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 in all cases of dispensation, 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 on University decisions

8.3.1 Complaints regarding Procedural Matters

8.3.1.1 The student is entitled to file a procedural complaint (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 complaints may be submitted to the Danish Agency for Science and Higher Education.

8.3.1.2 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. 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.

8.3.2 Complaints about Credit Transfers and Pre-approval of Credit Transfers

8.3.2.1 Complaints about the refusal or partial refusal of

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

can be submitted to a credit transfer complaints board in accordance with the rules on complaints boards for decisions regarding credit transfers for university programmes (the ministerial order on credit transfer complaints 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. 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

Transitional Curriculum Arrangements (programme specific)

Upon effective date of the curriculum, earlier curricula will be phased out and the affected courses will be taught and examined for the last time concurrently with the phasing out of the curriculum. For details please refer to the individual course descriptions.

Students enrolled on earlier curricula will continue on their current curriculum and will not be affected by these changes unless they are behind in their studies and have yet to pass courses that are no longer offered or for some other reason apply for change of curriculum.

Students enrolled on earlier curricula who do not follow the prescribed course of study will not be offered special teaching. Thus, students who have yet to pass courses that are no longer offered must replace those courses with courses from the new curriculum. This is only possible by written application to the Academic Study Board of the Faculty of Engineering and the application must be enclosed a study plan made in consultation with the programme administrator. Alternatively, students can apply to the study board for change of curriculum.

Leave of absence and re-enrolment: In cases of re-enrolment the faculty will decide whether the student is enrolled on this curriculum or will continue on his/her original curriculum. At the end of a leave of absence the student will be enrolled on his/her original curriculum unless the student applies for a change of curriculum.

When students change curriculum, courses passed will be credit transferred to compulsory courses in the new curriculum according to the below. There will be no transfer of or changes in the number of ECTS credits. This also applies when the credits on an earlier curriculum differs from the credits on the courses to which it is credit transferred. Only courses completed and passed in their entirety can be transferred.

Students enrolled in curricula before 2020, where the course Experts in Teams was 15 ECTS and have not yet passed this course must complete the following courses: T340059401 (MC-EXS 10 ECTS) + T340035401(MC-PMTS 5 ECTS).

Students who did pass the Experts in Teams course of 15 ECTS, will obtain credit transfer for T340059401 (MC-EXS 10 ECTS) + T340035401(MC-PMTS 5 ECTS).

▼ § 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. 23 of 9 January 2020 on Admission and Enrolment on Bachelor and Master's Programmes (candidatus) at Universities (Adgangsbekendtgørelsen)
- Danish Ministerial Order no. 20 of 9 January 2020 on bachelor and master's programmes (candidatus) at universities (Uddannelsesbekendtgørelsen)
- Danish Ministerial Order no. 22 of 9 January 2020 on University Examinations and Grading (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 om 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

01-09-2020

▼ § 9.5 - Date of Study Board Approval

04-06-2020

▼ § 9.6 - Date of Deans Approval

27-04-2020