Date: August 2021

Rev. April 2023
Technical corrections in assessments from 5th Semester

Rev. February 2024
SEP6 new name: IDE1

Rev. June 2024
DNP1-> DND1

Curriculum
Programme section

Bachelor of Global Business Engineering

Applicable to students enrolled in August 2021.
- **transition for students enrolled in 2019 & 2020***

*) Students enrolled in 2019 and 2020 will follow the study plan in appendix 1. Courses, learning objective and information regarding examination are given in appendix 3

Contents

Introduction

In accordance with the Executive Order on Bachelor of Engineering, the purpose of Bachelor of Engineering is to qualify the students to carry out the following professional functions nationally and Internalationally:

- Transpose technical research results as well as scientific and technical knowledge to practical use in development tasks and in solving technical problems
- Critically acquire new knowledge within relevant engineering areas
- Independently solve common engineering tasks
- Plan, implement and manage technical and technological facilities, including being able to involve social, economic, environmental and occupational health consequences in the solution of technical problems
- Participate in collaborative and managerial functions and contexts at a qualified level with people who have different educational, linguistic and cultural backgrounds

In addition, the education must qualify students to participate in further studies.

VIA Engineering programmes work on the basis of a common graduate profile. The graduate profile is a common profile for all VIA Engineers. The graduate profile is to be combined with the identity of the specific engineering programme.

At VIA Engineering, we are practice-oriented, project-oriented and world-focused. This is put into practice in the form of qualified new graduates obtained through targeted teaching, relevant research and development, as well as collaboration and ongoing dialogue with the business community. The programmes must qualify graduates to handle practical and development-oriented business functions.

Programmes in English as well as admission of International students are hallmarks of our engineering programmes. This profile creates a unique opportunity to educate students who can act in a Danish context in an increasingly global market. Our lecturers have vast and solid practical experience and know how to anchor theory in practice through lab work, company visits and projects for and in collaboration with companies.

1   Identity of the programme

VIA Global Business Engineering (GBE) focuses on applied science and technology in a unique combination with economics and marketing, as well as languages and culture. The hallmark of the programme is the Internalational focus and the inter-disciplinary skills, which will make the GBE graduate attractive to a wide range of companies.

GBE graduates are qualified to:
- Operate primarily in the industrial market, especially within the fields of mechanical engineering and software engineering.
- Fulfil managerial positions within design and implementation of technical solutions, as well as within marketing and sales in Denmark and abroad.
- Obtain positions, e.g. as project managers, export managers, product managers or marketing coordinators.
- Work independently as well as in teams with members from different educational and cultural backgrounds.
- Optionally continue their studies to achieve a master's degree.

The objectives of the programme are achieved primarily through:

- Interaction between theory and practice with focus on **business**, **engineering**, and **culture**. Through the **project work**, emphasis is also on developing the student's professional, methodological, communicative and personal skills.
- Providing an internalational study environment, with all courses offered and taught in English for Danish and internalational students, with the possibility to carry out parts of the programme abroad
- Active utilisation of the student's **Internalship** as a mean to exchange knowledge and experience between the university college and the industry.

2   Graduate profile for VIA Engineers

Purpose
The newly graduated VIA engineer works problem-oriented, project- and team-based and contributes to advising, developing, inventing and quality-assuring products and solutions. The VIA engineer creates innovative, digital, sustainable and workable solutions to and for current and future societal and engineering challenges worldwide.

Skills
VIA Engineering educate holistic-thinking engineers who, through societal insight and personal development, can exploit the full potential of technology. Therefore, the skills of the VIA engineer range from highly specialised engineering skills to personal skills and the skills of the outside world.

Professional engineering skills
- Masters and applies – with critical reflection – highly specialised engineering knowledge.
- Works challenge-driven, innovative and problem-oriented when developing engineering results.
- Integrates engineering and scientific knowledge, skills and methods in solving engineering challenges.
- Designs, plans, simulates, manages, implements and evaluates engineering solutions and products using digital and technological tools.
- Implements and operates solutions that match engineering needs within the industry.

Organisational skills

- Organises and manages projects and processes based on both risk assessment and market and business understanding.
- Collaborates inter-professionally with a global view and respect for the organisation, culture and methods of businesses and stakeholders.
- Involves knowledge of sustainability and circular economy in the development and implementation of new solutions.

Personal skills

- Works consistently with a curious and innovative mindset and seeks out, critically acquires and brings new knowledge into play throughout life.
- Communicates effectively and collaborates professionally with colleagues and people of different educational and cultural backgrounds.

3   Teaching and working methods

The engineering programme's priority focus areas within Digitalisation, Sustainability and Innovation and Entrepreneurship are integrated into relevant courses, so that together they constitute learning streams for all three areas.

Active and practice-oriented learning is supported by:
- Dialogue-based teaching with a high degree of active participation from students.
- Lectures in subjects where there is a large proportion of knowledge transfer. Lectures are usually combined with practice sessions with a student tutor.
- Project work and problem-oriented learning (PBL) are an essential part of the teaching, as the academic elements of the education programme are integrated into application-oriented engineering projects with emphasis on methodological problem solving.
- Projects being carried out in groups within the programme and in an interdisciplinary collaboration with other engineering programmes.
- Collaborating with research environments and businesses in connection with the implementation of the teaching.
- Offering an International study environment, where parts of the study can be completed abroad and where several courses are held in English for Danish and foreign students alike.
- The student's engineering Internship being actively used to bring about the exchange of knowledge and experiences between VIA and the profession.

Application- and practice-oriented skills are primarily achieved by utilising VIA's facilities within laboratories, manufacturing workshops and library.

Teaching can be physical, online or located at another campus. There may also be projects that are done together between two locations, ie. here the project work will then be online. In addition, there may be subjects where you partially participate online / transmitted with the offer in either Horsens or Aarhus.

4   Structure and content

The programme is organised as a full-time higher education. Science and technology make up for minimum 50 percent of the study programme. Business and Communication courses make up maximum the remaining 50 percent of the programme. Teaching is structured around class tutorials, assignments, lab exercises and workshop practice. Classes are small in order to allow group discussions and provide more individualised attention. Focus is on active student-centered learning to develop your critical thinking and interpersonal skills. Theory taught in classroom sessions is applied in problem-based projects. This prepares the student for the challenges after graduation.

After completing the 2nd semester, the GBE students must choose either a software engineering specialisation or a mechanical engineering specialisation. The programme structure and progression will be as indicated in the two tables for GBE-Software Engineering and GBE-Mechanical Engineering, respectively on the next page.

Electives and specializations are created to the extent that there are sufficient students enrolled in the elective or specialization.

The official duration of the degree program is 4½ years, divided into 9 semesters of 30 ECTS, corresponding to 270 ECTS points in total.

The scope of each course or project is documented in the form of ECTS points (European Credit Transfer System). 1 ECTS point corresponds to a workload of 27.5 hours for a student, an academic year of 60 ECTS thus corresponds to 1,650 hours of work for the student.

New students are admitted in August every year.

The study includes:
- Compulsory courses and projects
- Elective courses
- Internship
- Bachelor project
- Mandatory Workshops

A semester consists of 3-5 courses, which are delimited courses. A course's scope can range from 5 to 10 ECTS points, and a project's scope from 5 to 20 ECTS points.

The purpose, scope, learning objectives and exams of courses are described in this curriculum. For a detailed and complete description of the individual courses, please refer to the course descriptions in force at any given time, which are available on VIA's website and on VIA's Studynet.

There are 4 workshops associated with each of the engineering specialization programmes. Two of which are the same for the specialization.

The programme is structured as illustrated below:

Specialization within Software Engineering Technology – enrollment 2021:

Semester Theme	Course 5 ECTS	Course 5 ECTS	Course 5 ECTS	Course/ Project 5 ECTS	Project 5 ECTS	Project 5 ECTS
9. semester *Bachelor project*	**Elective**	**Elective**	**BPR1** Bachelor project			
8. semester *Internalship*	**INP1** Engineering Internship					
7. semester *Sustainable Product Development*	**Elective**	**MST1** Management and Strategy	**BIA1** Business Intelligence Analytics	**DND1** .NET Develop-ment	**SEP7** Semester Project	
6. semester *Innovation & Entrepreneur-ship*	**PRM1** Project Mana-gement	**WEB2** Web Develop-ment 2	**DAI1** Data Analytics Infrastructure	**SWE1** Software Engineering	**IDE1** Innovation and Entrepreneurship Project	
5. semester *Study Abroad*	**Elective**	**Elective**	**WEB1** Web develop-ment 1	**ERP1** ERP systems	**SEP5** Semester Project	
4. semester *Cross Discipli-nary work*	**DAT1** Data Analytics	**ECE1** Economics for Engineers	**DIG2** Digitalisation & Industry 4.0	**DBS1** Database Systems	**SEP4** Semester Project	
3. semester *International Business Development*	**IBC1** Intercultural Business Communication	**MAM2** Global Marketing Management	**SDJ1** Software Development with Java		**SEP3** Semester Project	
2. semester *Design and technology*	**GBC2** Global Business Communication	**MAM1** Marketing Management	**MAT1** Mathematics	**EBM1** Engineering Basic: Mechanical design	**SEP2** Semester Project	
1. semester *Software technology*	**GBC1** Global Business Communication	**BUE1** Business Economics	**MATx** Engeneering Mathematics	**EBS1** Engineering Basic: Software technology	**DIG1** Digitalisation 1: CAD & micro controllers	**SEP1** Semester Project

Specialization within Mechanical Engineering Technology – enrollment 2021

Semester Theme	Course 5 ECTS	Course 5 ECTS	Course 5 ECTS	Course/ Project 5 ECTS	Project 5 ECTS	Project 5 ECTS
9. semester *Bachelor project*	**Elective**	**Elective**	**BPR1** Bachelorprojekt			
8. semester *Internalship*	**INP1** Engineering Internship					
7. semester *Sustainable Product Development*	**Elective**	**MST1** Management and Strategy	**MEM1** Machine elements and design	**ELE1** Electronics	**SEP7** Semester Project	
6. semester *Innovation & Entrepreneurship*	**PRM1** Project Management	**TER1** Thermodynamcs	**MEC2** Mechanics	**DYN1** Dynamics	**IDE1** Innovation and Entrepreneurship Project	
5. semester Study Abroad	**Elective**	**Elective**	**TDE1** Technical Design	**IDP1** Innovation & Product design	**SEP5** Semester Project	
4. semester *Cross Disciplinary work*	**DAT1** Data Analytics	**ECE1** Economics for Engineers	**DIG2** Digitalization 2: Industry 4.0	**PHY1** Physics	**SEP4** Semester Project	
3. semester *International Business Development*	**IBC1** Intercultural Business Communication	**MAM2** Global Marketing Management	**MEC1** Mechanics	**MMT1** Materials and Manufacturing Technologies	**SEP3** Semester Project	
2. semester *Design and technology*	**GBC2** Global Business Communication	**MAM1** Marketing Management	**MAT1** Mathematics	**EBM1** Engineering Basic: Mechanical design	**SEP2** Semester Project	
1. semester *Software technology*	**GBC1** Global Business Communication	**BUE1** Business Economics	**MATx** Engineering Mathematics	**EBS1** Engineering Basic: Software technology	**DIG1** Digitalisation 1: CAD & micro controllers	**SEP1** Semester Project

5 Compulsory elements of the education programme

All courses and projects in the first four semesters are compulsory and most of the courses will be relevant for the semester project. The purpose of the semester projects are to link the semester courses together combining science, business- and cultural understanding. Being able to create this overview and understanding is the main strength of a Global Business Engineer.

2.-7. semester all contain a semester project amounting to 10 ECTS. Included will be learning inputs in form of videos, online lectures, learning paths etc. amounting up to 2.5 ECTS. The amount of learning inputs can vary in the different semesters. The learning inputs are followed up by discussions initiated by the project supervisor.

The overall purpose of the semester project is to link the semester's courses together as a whole. Study technique. project management, methodology, scientific theory, research methodology and teamwork are introduced through the study in connection with the semester projects.

Each semester is themed, and knowledge and skills are acquired through the courses, while competencies are acquired and can be tested in the project – Problem-oriented learning. The theme for each semester is as follows:

- 1. semester: Software technology
- 2. semester: Design & technology
- 3. semester: International Business Development
- 4. semester: Working Cross Disciplinary
- 5. semester: Study Abroad
- 6. semester: Innovation & Entrepreneurship
- 7. semester: Sustainable Product Development

5.1 1. semester: Software technology

Throughout the semester, the students are to acquire and develop good project management skills. The students must demonstrate their ability to work with cross-disciplinary challenges by implementing theoretical knowledge taught during the semester courses and thus working problem oriented.
More specifically for the first semester, the students must demonstrate their ability to design a proto type for a software solution and clarify if the R&D can be outsourced on the International market.

The purpose of the courses, ECTS and assessment:

Engineering Mathematics (MATx) – 5 ECTS	Assessment:
Students must gain general applied mathematical insight that contributes to an understanding of the crucial importance of mathematics in order to be able to describe, understand and communicate about scientific and technological issues. Through this, they must achieve a solid foundation to be able to commit and contribute actively, constructively and innovatively in their studies. Specifically, students must acquire competence to practice mathematical reasoning and logical thinking.	**Exam**: Individual written 4 hours. The final exam counts 100% **Assessor**: Internal **Prerequisites**: None **Reexam**: Can be oral
Business Economics (BUE) – 5 ECTS	
To obtain knowledge of how the firm profit is optimized under different market conditions and be able to analyse how external macroeconomic factors influence company's business environment.	**Exam**: Individual written 2 x 2 hours; each count 50% **Assessor**: Internal **Prerequisites**: None **Reexam**: As ordinary
Global Business Communication (GBC1) – 5 ECTS	

The purpose of this course is to develop the students' linguistic abilities and general communicative competences in English with special focus on communication in a professional context.	**Exam**: Individual written 4 hours. The final exam counts 100% **Assessor**: External **Prerequisites**: Yes **Reexam**: As ordinary
Digitalization (DIG1) – 5 ECTS	
The course aims to equip students with basic digital skills in engineering. The course is divided into two tracks: - 3D CAD and digital twins - Micro controllers and automation	**Exam**: Individual written 2 hours. The final exam counts 100% **Assessor**: Internal **Prerequisites**: Yes **Reexam**: As ordinary
Engineering Basic: Software Technology (EBS1) – 5 ECTS	
The main purpose of the course is to introduce the student to the field of software engineering; how basic computer program logic works and how to design and model an IT system.	**Exam**: Individual written 1 hour The final exam counts 100% **Assessor**: Internal **Prerequisites**: None **Reexam**: As ordinary
Semester Project (SEP1) – 5 ECTS	
The purpose is to give the students an introduction to problem-based learning through working with a specific problem. The problem includes three subject areas: Business Economics (BUE), Engineering Basics Software (EBS) and Global Business Communication (GBC1) within which areas a problem / case is worked on.	**Exam**: Written Group Project (and process) report and individual reflection report. The total hand-in counts 100% **Assessor**: Internal **Prerequisites**: Yes **Reexam**: As ordinary

The learning objectives of the courses (knowledge, skills and competencies) are given in Appendix 2.

Volume
30 ECTS credits

5.2 2. semester: Design & Technology

Throughout the semester, the students are to acquire and develop good project management skills. The students must demonstrate their ability to work with cross-disciplinary challenges by implementing theoretical knowledge taught during the semester courses.
More specifically in the second semester, the students must demonstrate their ability to design 3D CAD drawings for a prototype of a mechanical engineering product and subsequently make a marketing plan for the Danish market for the product. The students must plan to launch the product at an exhibition stand at an industrial fair.

Course purpose, ECTS and Assessment:

Marketing Management (MAM1) – 5 ECTS	**Assessment**
The purpose of the course is to obtain wide market-oriented knowledge in marketing management and develop skills in order to be able to conduct a complete marketing plan for any business/organisation and product/service using relevant theories and models to identify, design and choose between alternative operational, tactical and strategic marketing possibilities.	**Exam**: Individual 4-hour written exam. The final exam counts 100% **Assessor**: External **Prerequisites**: Yes **Reexam**: Can be oral
Global Business Communication (GBC2) – 5 ECTS	
The purpose of this course is to further develop the students' linguistic abilities and general communicative competences in English focusing especially on communication in a professional context. Special focus will be on academic writing requirements in terms of syntax, coherence	**Exam**: Individual written 4 hours The final exam counts 100% **Assessor**: External **Prerequisites**: Yes. **Reexam**: As ordinary

and structure, on technical English, report writing, presentations and information search on the semester theme. Focus will also be on developing oral communication based on business-related articles.	
Engineering Basic: Mechanical Design (EBM1) – 5 ECTS	
The purpose of the course is to provide the student with basic knowledge of engineering dynamics. In addition, the student must become familiar with problem solving techniques and achieve a solid basis for further technical and science education.	**Exam**: Individual written 4 hours. The final exam counts 100% **Assessor**: Internal **Prerequisites**: Yes **Reexam**: Can be oral
Mathematics (MAT1) – 5 ECTS	
The course aims to strengthen and expand the student's basic skills in mathematics, especially in differential calculus.	**Exam**: Individual written 4 hours. The final exam counts 100% **Assessor**: External **Prerequisites**: None **Reexam**: As ordinary
Semester Project (SEP2) – 10 ECTS	
The purpose of the semester project is for the students to learn to apply professional competencies in a problem-based context. Solve engineering issues based on current and previous semesters' subjects. And demonstrate the ability to prioritize between issues and work in detail with selected issue (s) Problem-based learning through working with a specific problem. The problem includes three subject areas: Marketing Management (MAM1), Mechanical Engineering Basic (MEB) and Global Business Communication 2 (GBC2) within which areas a problem / case is worked on.	**Exam**: Group examination with individual assessment. 15 minutes per student. The final exam counts 100% **Assessor**: Internal **Prerequisites**: Yes **Re-exam**: As ordinary

The learning objectives of the courses (knowledge, skills and competencies) are given in Appendix 2.

Volume
30 ECTS

5.3 3. semester: International Business Development

Throughout the semester, the students are to acquire and develop good project management skills. The students must demonstrate their ability to work with cross-disciplinary challenges by implementing theoretical knowledge taught during the semester courses.
More specifically in the third semester, students must prepare an International Marketing Plan for resp. a mechanical engineering and a software specialized solution. The students who have chosen machine direction must further demonstrate their ability to design 3D CAD drawings for the prototype of a mechanical engineering product where the students who have chosen software direction must demonstrate their ability to develop a single user system.

Course purpose, ECTS and Assessment:

Intercultural Business Communication (IBC1) – 5 ECTS	**Assessment**
The purpose of this course is to enable the students to interact successfully and competently with people from different cultures in their future professional capacities.	**Exam**: Individual oral 20 minutes. Preparation 20 min. **Assessor**: External **Prerequisites**: Yes **Reexam**: As ordinary
Global Marketing Management (MAM2) – 5 ECTS	
The overall purpose of this course is to enable students to device a global marketing strategy and prepare an international marketing plan for any product or service in any export market.	**Exam**: Individual written 4 hours. The final exam counts 100% **Assessor**: External **Prerequisites**: Yes

	Reexam: Can be oral
Software development with Java (SDJ1) – 10 ECTS	
The purpose of the course is to give the student the qualifications to understand core concepts in object-oriented programming, as well as the ability to implement smaller programs in Java based on UML class diagrams.	**Exam**: Individual oral 30 minutes The final exam counts 100% **Assessor**: External **Prerequisites**: Yes **Reexam**: As ordinary
Mechanics (MEC1) – 5 ECTS	
The course aims to provide the student with basic skills in statics and strength theory to be able to analyse and dimension products, machines and production equipment within the industrial field.	**Exam**: Individual oral 20 minutes. The final exam counts 100% **Assessor**: Internal **Prerequisites**: none **Reexam**: As ordinary
Materials and Technologies (MMT1) – 5 ECTS	
The main purpose of the course is to enable the student to choose relevant types of steel based on material properties and to select relevant manufacturing technologies.	**Exam**: Individual oral 25 minutes. The final exam counts 100% **Assessor**: Internal **Prerequisites**: None **Reexam**: As ordinary
Semester Project (SEP3) – 10 ECTS	
The purpose of the semester project is for the student to focus on learning in the chosen professional specialization (software or mechanical engineer) and put this in a global perspective with a focus on an Internationalization strategy.	**Exam**: Group examination with individual assessment. 15 minutes per student – maximum 1 hour per group. The final exam counts 100% **Assessor**: Internal **Prerequisites**: Yes **Reexam**: As ordinary

The learning objectives of the courses (knowledge, skills and competencies) are given in Appendix 2.

Volume
30 ECTS

5.4 4. semester: Working Cross Disciplinary

Throughout the semester, the students are to acquire and further develop good project management skills. The students must demonstrate their ability to work with cross-disciplinary challenges by implementing theoretical knowledge taught during the semester courses. More specifically for the fourth semester, the students must demonstrate their ability to design a cross-disciplinary, sustainable and profitable energy solution.

Course purpose, ECTS and Assessment:

Data Analytics (DAT1E) – 5 ECTS	**Assessment**
The purpose of the course is to make data analytics application-oriented so that the student can perform and present relevant results from data analytical processes. The student will encounter various statistical algorithms, data storage technologies, data quality and analysis methods.	**Exam**: Individual written 2 hours. The final exam counts 100% **Assessor**: Internal **Prerequisites**: None **Reexam**: Can be oral
Digitalization (DIG2) – 5 ECTS	
The future is increasingly focusing on digitization. Students are during the DIG2 course introduced to key concepts within digitization with a focus on global industrial digitization trends, their main features, potentials and limitations. The purpose of the course is to give students an understanding and a language that enables the student to participate in meaningful digitization projects	**Exam**: Course evaluation is a group-based exam. First, the group presents their synopsis together (10 min), followed by a group oral exam 30 min. (including voting). The synopsis counts for 50% and the exam counts for 50% of the final grade **Assessor**: Internal **Prerequisites**: None

	Reexam: As ordinary
Economics for Engineers (ECE1) - 5 ECTS	
The main purpose of the course is to enable students to assess and present the financial consequences of a business case concerning investments in capital equipment and/or product / market development	**Exam**: Individual written 3 hours. The final exam counts 100% **Assessor**: External **Prerequisites**: None **Reexam**: Can be oral
Databasesystemer (DBS1) – 5 ECTS	
The course has two purposes. Firstly, students are to learn methods for designing, implementing and operating single-user relational databases. Secondly, students are to learn the main principles, architecture and technologies of a typical relational database management system (RDBMS).	**Exam**: Individual written 4 hours. The final exam counts 100% **Assessor**: External **Prerequisites**: Yes **Reexam**: Can be oral
Physics (PHY1) – 5 ECTS	
The purpose of the course is to provide the student with basic knowledge of thermodynamics and electricity. In addition, the student must become familiar with problem solving techniques and achieve a solid basis for further technical and science education.	**Exam**: Individual written 4 hours. The final exam counts 100% **Assessor**: External **Prerequisites**: Yes **Reexam**: Can be oral
Semester Project (SEP4) – 10 ECTS	
The main purpose of the semester project is to apply professional competencies in a problem-based context with a focus on interdisciplinary collaboration between software and mechanical engineering specializations. A common technical solution must be developed, after which the profitability of this must be assessed.	**Exam**: Group examination with individual assessment. 15 minutes per student – maximum 1 hour per group. The final exam counts 100% **Assessor**: Internal **Prerequisites**: Yes **Reexam**: As ordinary

The learning objectives of the courses (knowledge, skills and competencies) are given in Appendix 2.

Volume
30 ECTS

5.5 5. semester: Study Abroad

Throughout the semester, students must acquire and develop good project management skills. The students must demonstrate their ability to work with interdisciplinary challenges by implementing theoretical knowledge taught in the semester courses. More specifically in the sixth semester, the student must focus on and further improve his / her skills in the chosen specialization subjects as well as demonstrate the ability to study and work with the technical field, preferably in an international environment at a foreign educational institution.
Course purpose, ECTS and Assessment:

Web Development (WEB1) – 5 ECTS	
The purpose of this course is to introduce a set of theories and tools in order for students to obtain a proficient level of knowledge and gain a practical set of skills for designing and developing responsive web sites for both desktops and mobile devices using basic web programming. (WEB1 was previously labelled RWD1, Responsive Web Design, running up to and including spring semester 2022.)	Exam Prerequisites: 1. Attendance (≥ 75%) 2. Course assignments handed in before deadline and approved. 3. If the exam prerequisites are not met, the student must complete a written assignment in WISEflow to qualify for the re-exam. This assignment will be scheduled after the ordinary exam. Type of exam: Digital written exam duration of 2 hours (2 parts): Part 1: Multiple choice questions 30 minutes, weighing 25%

	Part 2: Short answer questions 90 minutes (explaining and writing code), weighing 75% External assessment. Tools allowed: Part 1: without aids Part 2: all aids allowed - including internet connection. Any types of communication between students or between a student and an external party is prohibited and will be considered a violation of the exam rules. Also, the use of AI tools, such as AI tools, ChatGPT or similar AI and Machine Learning tools and chatbots is not allowed. Re-exam: Re-exams may be oral.
ERP-Systems (ERP1) – 5 ECTS	
There are two main purposes of this course: The first purpose (36 lessons) is to introduce students to the aspects of analysis, design, coding and testing company specified programs in the SAP ABAP environment. The second purpose (12 lessons) is to give the students the opportunity to work further with a selected part of the SAP System: - Object Oriented programming in ABAP - Development of SAP S/4 HANA - SAP for production planning etc.	Exam prerequisites: None Type of exam: Individual oral exam, 20 minutes. The exam is in two parts: First part is a presentation and discussion of selected parts of the course work (which consists of 2 mandatory written course assignments, handed in before deadline). Second part is drawn question from the theory of the course. Tools allowed: N/A Re-exam: Same as the ordinary exam. New assignments are accepted.
Innovation and Design of Products (IDP1) – 5 ECTS	
The main purpose of the course is to strengthen student's acquaintance with engineering procedures within the development and assessment of mechanical products from both the re-design and conceptual design perspectives. Human-centered design thinking, business assessment and innovation strategies will be of emphasis.	Prerequisites for exam: All assignments are submitted by the deadline. Exam type: Oral Examination in two sessions: 1) 15 minutes of group presentation of the key findings from the mandatory design project. 2) With the presence of all other group members, 15 minutes individual oral examination based upon the submissions and an additional question drawn at the examination. A list containing the additional questions will be accessible at minimum one week before the examination date. Examination counts for 100% of the final grade. Internal censor Tools allowed: The group-basis submissions and the tested (and refined) prototype. The lecturer will provide at the examination the additional questions list for reference purposes.

	Re-exam: Same as ordinary examination.
Technical Design (TDE1) – 5 ECTS	
The course aims to provide the student with knowledge and methods for outlining and illustrating machine constructions according to the applicable standardized rules.	Prerequisites for exam: All 13 mandatory assignments must be approved by the teacher. Exam type: Individual oral exam without preparation based on the course assignment handed in before deadline and uploaded to Wiseflow. Duration is 20 minutes The exam counts for 100% of the final grade Internal censor Tools allowed: All Re-exam: Same as ordinary
Semester Project (SEP5) – Market Research & Product Development**10 ECTS**	
The main purpose of the project is to develop or further develop a product or concept (with a focus on sustainability), carry out a market survey and draw up a business plan based on this. • Sustainable Product Development • Validation and need analysis via pretotyping • Customer Market research • Business plan including budget • Development of technical solution	Prerequisites for exam: None Exam type: Group exam on basis on project report (20 pages) and process report handed in on time. Individual assessment. Joint presentation and examination with discussion and individual question rounds. Estimated approx. 15 minutes per student incl. voting. Individual grades are given on the basis of an overall assessment of the submitted work as well as the individual´s performance during the exam.Internal Censorship Tools allowed: All Re-examination: The examination takes place as an ordinary examination. For students who have not passed the semester project, a mandatory information meeting will be held at the end of the spring semester. Here, information is provided on specific deadlines and detailed courses for the project work, just as new project groups are formed where possible in relation to the number of failed students in the individual semesters. Based on the feedback received after the ordinary exam, the student chooses either to prepare a new project or revise the non-passed project. This must be stated at the meeting.

	If the student has not submitted a project or participated in the ordinary exam (without an approved/valid reason, the student must make a new project

The learning objectives of the courses (knowledge, skills and competencies) are given in Appendix 2.

Volume
30 ECTS

5.6 6. semester: Innovation & Entrepreneurship

Throughout the semester, students must acquire and develop good project management skills. The students must demonstrate their ability to work interdisciplinary with innovation and entrepreneurship.
More specifically in the fifth semester, students must demonstrate their ability to design and develop an innovative product / service solution for a given company or organization within the industry.

Course purpose, ECTS and Assessment:

Project Management (PRM1) – 5 ECTS	Assessment
The purpose of the course is for the student to become familiar with the tools that can help the project manager to succeed in his/her work. The focus will be on how to organize a complex interdisciplinary project and use relevant tools to minimize the risk of failure.	Prerequisites for exam: Hand in and acceptance of all mandatory group assignments. Exam type: Written examination consisting of two reports. One being the written group report on the case work handed in before end of semester and one being a final individual reflection report produced after hand in of group report External censor is used. Grade is based on overall assessment of written group report and individual report. Tools allowed: All Re-exam: As ordinary
Web Development 2 (WEB2) – 5 ECTS	**Assessment**
The purpose of the course is to introduce the students to modern web development, by going in depth with the JavaScript language & the principles behind prominent JavaScript frameworks.	Exam prerequisites: 1. Attendance (≥ 75%) 2. All course assignments approved. If the exam prerequisites are not met, the student must complete a written assignment in WISEflow to qualify for the re-exam. This assignment will be scheduled after the ordinary exam. Type of exam: Individual written exam, 1 hour Internal assessment Tools allowed: None.

	Any type of communication between students or between a student and an external party is prohibited and will be considered a violation of the exam rules. Re-exam: Re-exams may be oral
Data Analytics Infrastructure (DAI1)	
The course introduces the student to selected topics in the design and implementation of infrastructure to support data analytics. Within this area, the course will introduce students to different tools and techniques for data acquisition, cleansing and integration. The students will also be introduced to data modelling for analytics and basic visualization.	Exam prerequisites: None Type of exam: Individual oral exam, 20 minutes without preparation. Exam is based upon course assignments handed in before deadline, and it is covering mandatory course work and theory covered in the course. Internal assessment Tools allowed: N/A Re-exam: Same as the ordinary exam
Software Engineering (SWE1) – 5 ECTS	
The purpose is to qualify the student to apply software engineering concepts used to develop object-oriented software. Structure the software development process by applying SCRUM and Unified Process to conduct Analyse, Design and Test-descriptions to exemplify a final solution from a real-life problem. This involves requirement capturing (Use Cases and non-functional requirements), analysis, domain models, interaction diagrams, design classes, design patterns and test-descriptions etc	Exam prerequisites: 1. Attendance (≥ 75%) 2. Course assignments handed in before deadline. The number will be determined at be beginning of the semester. If the exam prerequisites are not met, the student must complete a written assignment in WISEflow to qualify for the re-exam. This assignment will be scheduled after the ordinary exam. Type of exam: Individual oral exam, 20 minutes. Exam is without preparation and based on a drawn question. The questions will be known before the exam. Internal assessment. Tools allowed: All Re-exam: Conducted as the ordinary exam.

Dynamics (DYN1) – 5 ECTS	
The course aims to provide the student with basic skills in particle dynamics	**Prerequisites for exam:** Mandatory assignment in Mathcad. If the assignment is not handed in and approved by the deadline set by the teacher, the prerequisites are not met. A new assignment and deadline will be set before the reexam. **Exam type:** Written 4 hours. If the student prepares their solution by hand he/she must scan the solution at the end of the exam. Scanners will be provided. External censor **Tools allowed:** All, but no communication and no use of websites during the exam. **Re-exam:** The school can decide to conduct the reexam as an oral exam
Mechanics (MEC2) – 5 ECTS	
The aim of the course is to enable the student to analyse stresses, strains and deformations in structures with the purpose of assessing a machine construction in relation to safety against permanent deformation and fracture.	**Prerequisites for exam:** Tests in the laboratory and associated report of app. 3-4 pages have been completed and approved. The work must be carried out in groups of approx. four students. The scope of the work is approx. 6 hours per student. **Exam type:** Individual oral exam based on solving an assignment found by drawing lots. The duration is approx. 20 minutes. No preparation time for the exam. The exam assignments are handed out at least one week before the exam. Exam counts 100% of the final grade. External examiner. **Tools allowed:** None, however, the course textbooks will be available in the exam room. **Re-exam:** As ordinary

Thermodynamics (TER1) – 5 ECTS	
The student will obtain knowledge of the basic theory within thermodynamics and be able to perform elementary thermal calculations. Incorporate energy aspect in mechanical projects and have a basic knowledge of energy specialisation.	Prerequisites for exam: Mandatory assignments. If the assignment is not handed in and approved by the deadline set by the lecturer, the prerequisites are not met. A new assignment and deadline will be set before the re-exam. Exam type: Written 4 hours, Digitally submission The final exam counts 100% External censor Tools allowed: All Re-exam: As ordinary Final examinations counts for 100 % of final grade
Innovation & Entrepreneurship project (IDE1) – 10 ECTS	
A cross-sectoral semester project that aims to develop and document an across disciplinary innovation and entrepreneurship project based on primary data collection.	Exam prerequisites Hand in 6 written assignments to be approved in WISEflow before deadline. Type of exam: Exam is based upon the IDE1-report submitted in WISEflow before deadline. The group presents their prototype/pretotype. The exam room can be customized by the group to support the presentation. Group exam with individual assessment. Group presentation approx. 15 minutes followed by joint evaluation with joint discussion and individual question rounds for approx. 60 minutes per group including assessment. Individual grades are given based on an overall assessment of the submitted work as well as the individual's presentation during the exam. External assessment. Tools allowed: All. Re-exam: Based on the submitted project, the examiner gives the student guidance on necessary improvements in relation to passing the exam (possibly, that a new project should be prepared). The students are informed about specific deadlines and details of the project work. Project groups are formed if possible. No further guidance is provided in the period leading up to submission. The project is assessed at an oral project exam.

The learning objectives of the courses (knowledge, skills and competencies) are given in Appendix 2.

Volume
30 ECTS

5.7 7. semester: Sustainable Product Development

Throughout the semester, the students are to fine tune their project management skills. The students must demonstrate their ability to work with cross-disciplinary challenges by implementing theoretical knowledge taught during the previous semester courses. More specifically for the seventh semester, are to prepare for their bachelor project comprising all three GBE elements – applied business, applied engineering and applied language and culture focusing on the UN 17 goals.

Course purpose, ECTS and Assessment:

Strategy, Organization and Management (MST1) – 5 ECTS	Assessment
The purpose of this course is for the students to gain and apply knowledge on management and strategy theory, tools and planning processes in an organizational context.	Prerequisites for exam: None Exam type: Individual oral exam with external censor based 50/50 on the written report (max 15 pages) and the course curriculum. The written report must be handed in before deadline set by the teacher. Duration – 20 minutes per student including evaluation. Tools allowed: All Re-exam: As ordinary
Business Intelligence Analytics (BIA1) – 5 ECTS	
The main purpose of the course is to give the student the professional skills to deliver BI-solutions with a general and accessible BI-tool. The student will become capable of developing and delivering reporting solutions that can support business processes.	Prerequisites for exam: Participation in the examination requires that the student conducts at least one workshop during the course and collects feedback. Exam type: Individual oral exam 20 minutes including grading. Exam counts for 100% of the final grade Assesment: Internal Reexam: Same as the ordinary exam unless special circumstances calls for a different exam.
.NET Development (DND1) – 5 ECTS	

The purpose is to qualify the student to describe and implement the basic concepts of the C# programming language and the .NET developer platform.	Prerequisites for exam: Mandatory attendance (4/6 lessons) Exam type: The exam is in two separate parts: Part 1 (25%): Written, individual, 1 hour, flowLOCK. Part 2 (75%): Project assignment, carried out in groups of 2-4 students during the semester. The evaluation of Part 2 is based on: - The delivered software - Documentation of technical process via a developer blog - Group presentation (video) - Individual reflections (video) To pass the course, Part 2 must be completed with a passing grade. Internal assessment Tools allowed: Part 1: None Part 2: All Re-exam: Should a student receive a non-passing grade for Part 2, they will be asked to resubmit the project during the re-exam period. Should a student receive a passing grade for Part 2, but a combined non-passing grade, they will receive a new Part 1-exam during the re-exam period. Any third resit may be conducted as an oral exam.
Machine Elements and Design of Machines (MEM1) **5 ECTS**	
To acquire methods and tools in machine elements, technical design and dynamically loaded shafts.	Prerequisites for exam: None Exam type: Oral group exam without preparation based on a course assignment handed in before deadline. Duration for 2 students approx. 30 min. incl. 5 minute group presentation. Incl. assessment. Exam counts 100% of the final grade. Internal censor Tools allowed: All Re-exam: As ordinary
Electrical Engineering (ELE1) – 5 ECTS	
The main purpose is to gain knowledge about electrical systems, electrical installations and to be able to calculate and select correct electric motors.	Prerequisites for exam: None Exam type: Oral group exam without preparation based on a course assignment handed in before deadline.

	Duration for 2 students approx. 30 min. incl. 5 minute group presentation. Incl. assessment. Exam counts 100% of the final grade. External Examiner. <u>Tools allowed</u>: All <u>Re-exam</u>: As ordinary
Semester Project – Sustainable product development (SEP7) – 10 ECTS	
To develop and practice cross-disciplinary Global Business Engineering competences within sustainable product & business development. **Objective:** Develop a new or modify an existing product/concept/business model for a specific company or organization that fulfills the company/organizations environmental, social and governance (ESG) profile and strengthens its overall strategic position within the business segment it is operating.	<u>Exam prerequisites</u> Ca 5 pages approved literature study Approved Project Description <u>Examination type:</u> Group exam with individual assessment based on a project report (max.30 pages) and process report incl risk assessment handed in before deadline. Group presentation approx. 15 minutes followed by a joint examination with a joint discussion and individual question rounds for approx. 20 minutes per student including voting. Individual grades are given on the basis of an overall assessment of the submitted work as well as the individual's performance during the examination. Internal examiner. <u>Allowed tools:</u> All <u>Re-examination:</u> The examination takes place as an ordinary examination. For students who have not passed the semester project, a mandatory information meeting will be held at the end of the spring semester. Here, information is provided on specific deadlines and detailed courses for the project work, just as new project groups are formed where possible in relation to the number of failed students in the individual semesters. Based on the feedback received after the ordinary exam, the student chooses either to prepare a new project or revise the non-passed project. This must be stated at the meeting. If the student has not submitted a project or participated in the ordinary exam (without an approved/valid reason, the student must make a new project

The learning objectives of the courses (knowledge, skills and competencies) are given in Appendix 2.

6   8. semester: Internship

The Internship comprises a semester of 30 ECTS and timewise is placed in the 8th semester of the programme. As a general rule the Internship period is paid and settled in a private or public company in Denmark or abroad. Student must be on an Internship for a minimum of 20 full weeks excluding holidays, etc.

The purpose of the Internship is for the student to acquire insight into practical common engineering work corresponding to engineering assistant work, combined with the integrated application of the acquired concepts, methods and techniques of the discipline in the first seven semesters.

The student themselves is responsible for finding an Internship, which must be approved by VIA, who appoints a supervisor for the Internal.

In collaboration with the company, the student prepares a plan for the Internship with appertaining formulated assignments.

The basis for assessment of the Internship is an ongoing report from the student to VIA, feedback from the Internship company and a presentation where the supervisor can ask elaborating questions about the content of the Internship.

If the engineering Internship is interrupted before the end of the agreed Internship period, the Internship supervisor must, in consultation with the head of the education programme, assess whether the Internship has been of sufficient length and content for there to be grounds for passing the Internship present.

The Internship is assessed approved / not approved by the internal supervisor.

7   Electives

The Global Business Engineering program consists of 25 optional ECTS credits, where the student can choose courses on all VIA's engineering programs from a preselected pool of courses determined by the program. The pool of courses depends on the specialization. Descriptions of the Global Business Engineering Program's elective courses appear from the overview below as well as from the course descriptions in appendix 3. Subjects in other fields can be found in the respective curricula as well as on MyVIA

It is also possible to choose one course of 5 ECTS from another education program at VIA, but not courses where the content essentially consists of material from the previous courses of study. Any course choice from other programs must be approved by a study advisor in the engineering programs, as it must be ensured that the chosen course is relevant to the program and constitute an increasing academic level.

Electives are offered to the extent that there are sufficient students enrolled in the elective. If the elective is not offered, or if too many people enroll in the course, this can result in the student being assigned his or her second priority.

The following elective courses are offered at the Global Business Engineering program. (Selected electives are taught in Danish - the rest in English).

The learning objectives of the courses (knowledge, skills and competencies) are given in Appendix 2.

Digital Marketing (DMA1) 5 ECTS	Bedømmelse
In the ever-evolving marketing landscape, it is critical for a business to integrate all digital marketing efforts into its overall marketing strategy assuring seamless customer experience. Therefore, the purpose of this course is for the student to learn the supporting theory and tools needed to: Learn the key concepts and understand the use of tools necessary in B2C and B2B companies that will allow them to compete effectively. Speak one language with digital marketing team working on cross functional projects, adding value in DM strategy formulation/execution/evaluation process. Design a framework based digital marketing strategy in order to achieve marketing objectives through applying digital media, data and technology. To be able to analyse, map and design the customer experience pathways.	Prerequisites for exam: None Exam type: Mandatory assignment handed in before deadline and in line with the project description and requirements including alignment with the VIA Guidelines for writing projects. The assignment accounts for 30% of the total grade. Individual oral examination. The exam will include student's presentation of key aspects of the group project. It should include reference to: 1. The corresponding course models and theories 2. The key findings and recommendations 3. Additional reflections / personal comments outside of the written report A Q&A will follow Oral Exam accounts for 70% of the total grade (Total time 20 min: 5 min presentation, 10 min Q&A, 5 min evaluation). Internal censor Tools allowed: Personal notes, Final Project, (no class slides) Re-exam: As ordinary exam.
Personal Selling and sales Management (SSM1) **5 ECTS**	
Enabling the student to carry out a professional sales presentation for any business and product/service by mastering all the steps in the sales process from prospecting to obtaining the order and the follow-up phase.	Prerequisites for exam: None Exam type: Individual oral exam with internal examiner based on the written report of a sales case handed in before deadline set by the teacher and the curriculum. Duration – 20 minutes per student including evaluation. Tools allowed: All Re-exam: As ordinary.
Entrepreneurship (ENT1) **5 ECTS**	
The purpose of the course in entrepreneurship is to learn about the entrepreneurial process through theories, reflection and practical exercises enabling students to put the theories and reflections into practice, by learning through entrepreneurship. The aim is to make the student aware that entrepreneurship is about Ideas, Resources & Taking Action. This requires an entrepreneurial mindset, and therefore, involves professionalism, personality, identity and values whether you make changes in existing organizations (Intrapreneurship) or start a new business (Entrepreneurship)	Prerequisites for exam: None Exam type: Oral group examination consisting of a group presentation based on students portfolios, followed by a discussion between students and examinators. The portfolios will consist of both group and individual assignment and needs to be handed in before a deadline set by the lecturer. Duration of exam will be 60 minutes to groups of 3 or 4 persons or 75 minutes to groups of 5 or 6 persons. Internal censor is used. Individual grade is based on overall assessment of written group report, presentation and discussion and individual report. Tools allowed:

	All
	Re-exam:As ordinary.

Product Management (PMA1) 5 ECTS	
The purpose of this course is for the students to gain and apply knowledge on product management theories, tools and planning processes in an organizational context.	Prerequisites for exam: None Exam type: Individual oral exam with internal censor based on the written report on the case work handed in before deadline and the curriculum. Duration – 20 minutes per student including evaluation. Tools allowed: All Re-exam: As ordinary.
VIA Summerschool – Sustainable Intrapreneurship 5 ECTS	
The purpose of this course is to develop knowledge, skills and competences that enable students to become sustainable change makers in excisting companies.	Throughout the course, the students will learn through action and reflection captured in a portfolio, which in a synopsis form will be the basis of an oral examination with an internal examiner.

8 Projects for international students enrolled on Global Business Engineering exchange program

Exchange students can choose different projects during their stay, which are either based on the full-time students project in the 7th semester (SEP7) or the bachelor's project (BPR1)
If the students are not familiar with the project method of the engineering programs called PM, it is included in the teaching of the project work. The tuition is equivalent to what full-time students receive in the first semesters.

In general, The Augsburg project is offered to international students who are admitted for a shorter period than a semester. It is equivalent to the project full-time students have in the 5th semester (SEP5). The project has a scope of 10 ECTS including project method teaching.

International Project within Business and Communication (PM) – SPRPM1 10 ECTS	**Assessment**
The main purpose of the course is to introduce the students to the project-organized and problem-oriented methodology that is used in connection with student projects work at VIA Engineering, VIA University College. The course will introduce the students to a range of relevant theories, tools and practical methods concerning project methodology. Following the lectures, the students will apply theory and models in a project executed as project work in groups under supervision of a supervisor.	During the course a project description must be developed and approved by the group supervisor. Only groups that hand in the written project by the stated deadline will have access to the project exam. Group examination with individual mark based on the course assignment. Group presentation - app. 20 minutes - followed by joint questioning session of app. 15 minutes / student. Internal I examiner.
International Project within Business and Communication – SPR2 10 ECTS	
The main purpose of the course is to enable the students to utilize their engineering skills and experience with Project Methodology in a group project executed in accordance with the project-organized and problem-oriented	Requirements for attending examination During the course a project description must be developed and approved by the group supervisor. Only groups that hand in the written project by the stated deadline will have access to the project exam.

methodology that is used in connection with student projects work at School of Business and Technology, VIA University College.	Type of examination: Group examination with individual mark based on the course assignment. Group presentation - app. 20 minutes - followed by joint questioning session of app. 15 minutes / student. Internal examiner
International Project within Business and Communication – FPRPM1 **15 ECTS**	
The main purpose of the course is to introduce the students to the project-organized and problem-oriented methodology that is used in connection with student projects work at VIA Engineering, VIA University College. The course will introduce the students to a range of relevant theories, tools and practical methods concerning project methodology. Following the lectures, the students will apply theory and models in a project executed as project work in groups under supervision of a supervisor.	During the course a project description must be developed and approved by the group supervisor. Only groups that hand in the written project by the stated deadline will have access to the project exam. Group examination with individual mark based on the course assignment. Group presentation - app. 30 minutes - followed by joint questioning session of app. 15 minutes / student. Internal or external examiner There will be given a mark from the ECTS scale (for fulltime students from the corresponding 7 step scale).
International Project within Business and Communication – FPR2 **15 ECTS**	
The main purpose of the course is to enable the students to utilize their engineering skills and experience with Project Methodology in a group project executed in accordance with the project-organized and problem-oriented methodology that is used in connection with student projects work at VIA Engineering, VIA University College.	Requirements for attending examination During the course a project description must be developed and approved by the group supervisor. Only groups that hand in the written project by the stated deadline will have access to the project exam. Type of examination: Group examination with individual mark based on the course assignment. Group presentation - app. 30 minutes - followed by joint questioning session of app. 15 minutes / student. External examiner
Augsburg project – SEP5: Market Research & Product Development **10 ECTS**	
The main purpose of the project is to develop or further develop a product or concept (with a focus on sustainability), carry out a market survey and draw up a business plan based on this. • Sustainable Product Development • Validation and need analysis via pretotyping • Customer Market research • Business plan including budget • Development of technical solution	Prerequisites for exam: None Exam type: Group exam on the basis on project report (20 pages) and process report handed in on time. Individual assessment. Joint presentation and examination with joint discussion. Individual question rounds for approx. 10 minutes per student incl. voting. Approx. 1 hour per group. Individual grades are given on the basis of an overall assessment of the submitted work as well as the individual´s performance during the exam. Internal Censorship Tools allowed: All Re-exam: The re-exam takes place as an ordinary exam. The main supervisor decides in consultation with the examiner whether the student who has not passed the semester project must submit a revised project report or complete a new project.

9 Technical Workshops

The workshops are practice-related courses lasting one week (not ECTS-giving). The courses are conducted in parallel with 2-5 semesters. All workshops are compulsory and some are located outside campus.

The technical workshops structured as illustrated below:

Semester	Workshop Software Specialisation	Workshop Mechanical Specialisation
4. semester	**Advanced Excel (GX-WS3)** Introduction to advance Excel.	
3. semester	**Workshop: Working with Data in Python *)GH/GA-WS2S)**	**Workshop Mechanical (ME-PWS1 + ME-PWS2)** PWS1: Turning and milling PWS2: Welding, cutting and bending
2. semester	**Know your Profession (GH-WS1)** What jobs can a Global Business Engineer take on within the different field of specialisations.	

10 Bachelor Project

BPR1

The programme is concluded with a bachelor project (BPR1) which constitutes 20 of the total 270 ECTS credits of the programme and is finalized with an examination.

The bachelor project must demonstrate independent critical reflection within the chosen topic, and must document the student's ability to apply engineering theories and methods. The bachelor project must also reflect the student's ability to express themselves in an academic and structured manner within their subject.

It is highly recommended that the bachelor project is done in groups of 2-4 students.

The bachelor project includes an independent experimental, empirical and/or theoretical treatment of a practical problem in connection with the central topics of the education programme.

The project must be documented in the form of a report containing a project basis, solution description, calculations, drawings, etc. If the report is a group assignment, it must be clear who wrote which sections of the report.

The students are examined in the project by oral examination/group test with individual assessment in accordance with the programme's overall goals as described in Section 1 of the Curriculum. The basis for examination is the bachelor project. It is a prerequisite for participation in the exam that the bachelor project is submitted within the stipulated deadline and meets the described criteria for the project.

Examinations can take place at the earliest when all the other examinations of the programme, including internships, have been passed. The examination is assessed according to the 7-point scale and with the participation of an external examiner.

Bachelor project (BPR1) 20 ECTS	Assessment
The main purpose for the Bachelor Project is that students must demonstrate that they have achieved the objectives set for the Global Business Engineering programme by solving a real-life problem which could be typical for their future area of work using relevant theories and methods. . The project consists of two main elements: 1. Applied engineering. 2. Applied business and culture The two elements have to be integrated in the project to demonstrate that the key Global Business Engineering competences have been achieved. The exact distribution of the two elements will depend on the specific project problem, but both have to be included and have a certain level of depth to reflect the accumulated learnings during the GBE education. The project should preferably be made for/in co-operation with a real company.	Prerequisites for exam: All other exams and semester projects must be passed. Exam type: Oral exam based on project report handed in before deadline. Group presentation (15 minutes per project + 5 minutes per student if more than one student in the group) The total time for the oral exam including group presentation, examination, evaluation and feedback will be: • Groups of one student: 60 minutes • Groups of two students: 90 minutes • Groups of three or more students: 120 minutes The basics for the examination are the Project report (Including Product Description, Process Report and appendices included) and the presentation of the project. External censor Tools allowed: All Re-exam: Standard procedure for re-examination is to write a new project. Timing of re-examination follows the ordinary examination periods at GBE in January and June. There are 3 attempts to pass the bachelor project. Failure to hand in a bachelor report on time results in one missed attempt. Example: report is not handed in for the January exam. Handing in the report for the exam in June will constitute attempt no 2 and so on. 3rd and last attempt will be in January the following year. All in all, the bachelor project must be completed within one year (January-June-January). Exception to these rules will only be granted in the most exceptional of circumstances, e.g. serious illness, and must be approved by the GBE head of Department.

11 Title and issue of diploma

Graduates who have completed the studies under this curriculum are entitled to use the title **Bachelor of Engineering in Global Business Engineering** and the title **Bachelor of Engineering** in an engineering firm.

Upon completion of the programme, VIA University College issues a diploma indicating title, programme, and information about the results of the grades obtained. Furthermore, the diploma contains information about the bachelor thesis. In addition, the admittance level on which the graduate was admitted to the programme is noted.

Should the education be discontinued, proof of passing study units is issued.

12 Appendix 1 (Study plan for students starting in 2019 and 2020)

For students admitted to the programme in 2019 up to and including 2020, the following transitional arrangement will enter into force from August 2021.
Courses that are no longer part of the curriculum has to be passed the no later than winter exam 2022.

Specialization within Software Engineering Technology

Semester *Theme*	Course 5 ECTS	Course 5 ECTS	Course 5 ECTS	Course 5 ECTS	Project 5 ECTS	Project 5 ECTS
9. semester *Bachelor Project*	Elective	Elective	BPR1 Bachelor Project			
8. semester *Internship*	INP1 Engineering Internship					
7. semester *Sustainable Product Development*	DNP1 .NET programming	ERP1 ERP systems	MST1 Strategy, Organisation & Management	SEP7 Semester Project		
6. semester *Study Abroad*	Software Elective	Software Elective	Elective	Elective	BUI Business Intelligence	WEB2 Web Development
5. semester *Innovation & Entrepreneurship*	SDJ2 Software Development with Java		SWE1 Software Engineering	LANG3 Language	SEP5 Semester Project	
4. semester *Cross Disciplinary*	DBS1 Database Systems	RWD1 Responsive Web Design	FCM1 / ECE1 Financial Management / Economics for Engineers	LANG2 Language	INO1 Cross Disciplinary Innovation	SEP4 Semester Project
3. semester *International Business Development*	SDJ1 Softwareudvikling med Java		BUE1 Business Economics	LANG1 Language	SEP3 Semester Project	
2. semester *Design & Technology*	GBC2 Global Business Communication	MAT2 Mathematics	MAM2 Global Marketing Management	ENB-M1 Engineering Basic: Mechanical design	IBC1 Intercultural Business Communication	SEP2 Semester Project
1. semester *Robotics*	GBC1 Global Business Communication	MAT1 Mathematics	MAM1 Marketing Management	ENB-ICT1 Engineering Basic: Software Technology	SSE1 Study Technique for Engineers	SEP1 Semester Project

Specialization within Mechanical Engineering Technology

Semester Theme	Course 5 ECTS	Course 5 ECTS	Course 5 ECTS	Course 5 ECTS	Project 5 ECTS	Project 5 ECTS
9. semester *Bachelor Project*	**Elective**	**Elective**	**BPR1** Bachelor Project			
8. semester *Internship*	**INP1** Engineering Internship					
7. semester *Sustainable Product Development*	**MEM1** Machine Elements and Design	**ELE1** Electronics	**MST1** Strategy, Organisation & Management	**SEP7** Semesterprojekt		
6. semester *Study Abroad*	**Mechanical Elective**	**Mechanical Elective**	**Elective**	**Elective**	**MEC2** Mechanics	**TER1** Termo Dynamics
5. semester *Innovation & Entrepreneur-ship*	**MMT1** Materials and technologies	**CAD2** Avanceret design in 3D CAD	**TDE1** Technical Design	**LANG3** Language	**SEP5** Semester Project	
4. semester *Cross Disciplinary*	**DYN1** Dynamics	**ENB-M2/PHY1** Electronics and thermo Dynamics	**FCM1 / ECE1** Financial Management / Economics for Engineers	**LANG2** Language	**INO1** Cross - Disciplinary Innovation	**SEP4** Semester Project
3. semester *International Business Development*	**MEC1** Mechanics	**MAT3** Mathematics	**BUE1** Business Economics	**LANG1** Language	**SEP3** Semesterprojekt	
2. semester *Design & Technology*	**GBC2** Global Business Communication	**MAT2** Mathematics	**MAM2** Global Marketing Management	**ENB-M1** Engineering Basic: Mechanical Design	**IBC1** Intercultural Business Communication	**SEP2** Semester Project
1. semester *Robotics*	**GBC1** Global Business Communication	**MAT1** Mathematics	**MAM1** Marketing Management	**ENB-ICT1** Engineering Basic: Software Technology	**SSE1** Study Technique for Engineers	**SEP1** Semester Project

13 Appendix 2: Courses in the Global Business Engineering Programme – enrollment 2021

Code	Title	ECTS	Knowledge	Skills	Competencies
ENG-IDE1	Innovation and Entrepreneur-ship project	10	After having successfully completed the course, the students will have gained: • An understanding of innovation and entrepreneurship and its uses within the field of engineering and business. • Knowledge about three different innovation processes Design Thinking, Effectuation and Lean Startup • Knowledge about how to create a systematic and measurable progress in innovation and entrepreneurship tasks	After having successfully completed the course, the students will be able to: • Engage in innovative and entrepreneurial processes in a cross-discipline setting • Conceive, plan, and execute innovative ideas • Work methodically with innovation and entrepreneurship • Collect and apply relevant data/information about technologies, markets, and end users • Apply method to gain insights about the solutions impact on the current market. • Convey and argue for the results of a cross-disciplinary project group and the project group's learning process using correct professional terminology and optimal tools both in writing, graphically and orally.	After having successfully completed the course, the students will have gained competences in: • Introducing innovative ideas into project work • Contributing own professional skills in multidisciplinary teams with the objective of solving problems by using innovative and entrepreneurial processes and models • Clarifying multidisciplinary group competencies • Analyze group dynamics and adapt working methods and collaboration methods to new group constellations to achieve effective collaboration in cross-disciplinary project teams • Independently structuring and planning own learning process in an inter-disciplinary learning environment Able to independently argue for the application and implementation of valid knowledge
GBE-BIA1	Business Intelligence Analytics	5	• Account for different langauges for analytical dataprocessing and their areas of application. • Discuss basic terms and concepts within BI • Account for the use of BI in a business context • Reflect on how data can be used to make business decisions	The student can • Load data from different file formats • Choose visualizations to support data analysis • Calculate performance indicators for one or more business processes	The student can • Develop BI solutions (reports, dashboards, etc.) • Independently plan and execute a BI deliverable

Code	Title	ECTS	Knowledge	Skills	Competencies
			• Identify different types of data sources • Account for security in a BI-context • Account for different types of calculations in a BI offering • Reflect on the areas of applications for BI solutions in a business context	• Justify choices in the development of a BI deliverable • Apply parameters • Handle security needs in a BI context	• Make informed choices in connection to a BI deliverable
GBE-BPR1	Bachelor Project (GBE/GBT)	20	The students must demonstrate detailed knowledge of the core elements of all the subjects, theories, models and methods, which have been part of the Global Business Engineering syllabus.	The students must demonstrate their ability to choose and apply relevant theories models and methods from the total Global Business Engineering syllabus to solve a real life problem.	The students must demonstrate their ability analyze a real life problem, use relevant theories, models and methods for creating a solution and present the solution, findings and conclusions in a well written project report.
GBE-BUE1	Business Economics	5	After the course the students should be able to: • Identify and sketch the firm's demand and supply functions • Identify and sketch the optimal price and quantity that maximizes the firm's profit. • Identify and sketch the different market structures • Identify and sketch the aggregate demand and supply for the market / industry • Identify the Macroeconomic tools and objectives • Identify and describe the different macroeconomic policies	After the course the students should be able to: • use appropriate tools to model company price and output decisions under different market structures • analyze and assess efficiency and welfare optimality of perfectly and imperfectly competitive markets • analyze and asses the effects of externalities and public goods on efficiency • analyze and assess government policies aimed at improving welfare.	After the course, the students should be able to: • use the most important theories from "Microeconomics" to analyze the business microeconomic environment • understand cost structures of firms and be able to find the optimal price and quantity that will maximize a firm´s profit under different assumptions of market structures • use the most important theories from "Macroeconomics" to obtain knowledge on the global macro economy • analyze and assess the connection between various macroeconomic changes and the significance of the change to the concrete company

Code	Title	ECTS	Knowledge	Skills	Competencies
GBE-DMA1	Digital Marketing	5	The students will be introduced to core theories, models and tools in the field of digital marketing that will result in knowledge of: - The role of digital marketing as a part of business world and company's overall marketing strategy using the SOSTAC model - Integrated digital marketing by using the RACE framework - Translating SMART goals into digital strategy formulation - To validate the relevance and the usefulness of tools in connection with decisions concerning DM strategic choices. - Based on a digital marketing strategy analyse, map and design the customer experience - Developing customer personas - Online customer journeys with digital touchpoints - Understand social media's potential for relationship-building and online community creation. - Lead generation and qualifying of prospects with inbound marketing methods - SEO and SEM (paid search marketing) - Marketing automation - To identify the control methods for DM programs that correspond with business objectives.	At the end of this course, and having completed the essential reading and activities, the students should be able to Participate in the planning and execution of a company's digital marketing Identify key factors relevant for the planning process Define DM KPIs corresponding with business objectives Choose and integrate relevant digital channels into a company's overall marketing strategy, depending on context and objectives Describe social profiles/personas Create customer journey maps with relevant digital touch points	After a successful completion of the course the student will have the competencies to: Develop strategies for obtaining competitive advantages through digital marketing Measure and evaluate on a company's digital marketing strategy Design DM strategies according to a company's objectives and available resources. Utilize social media's potential for relationship-building and online community creation Analyse and identify best ways to attract customers via SEO efforts Develop strategies for marketing automation
GBE-DND1	.NET Development	5	The student will be able to: - Describe the fundamentals of .NET development and the common type system	The student will be able to: - Write and debug C# code	The student will be able to: - Develop console applications, web applications and web services with

Code	Title	ECTS	Knowledge	Skills	Competencies
			- Identify and describe .NET technologies relevant to application development	- Navigate and use the managed .NET API - Create and consume class libraries - Implement and consume RESTful web services - Utilize asynchronous programming - Implement web applications within ASP.NET - Create and interact with relational databases using an object-relational mapping library - Compare object-relational mapping to traditional data access techniques - Define and implement basic authentication and authorization	- Server-side and client-side C#-programming - Data persistence using object-relational mapping - User management, including authentication and authorization - Analyse and evaluate the relevance of .NET technologies when designing software applications
GBE-EBS1	Engineering Basic - Software Technology	5	• Describe the basics of computer software program logic and flow. • Describe imperative programming concepts, including assignments, loops, variables, conditions, and expressions. • List common data types and describe the concept of type conversion. • Identify the basic components of computer hardware architecture. • Describe the components and properties of embedded systems. • Identify the basic UML activity diagram notations and symbols. • Identify and describe the different stages of a software development process.	• Solve basic programming tasks through a visual programming language and scripting. • Work with basic data structures, including arrays. • Apply the basic operations of boolean algebra. • Design and describe an IT system, including using UML activity diagrams. • Create simple interactive applications and games.	• Design and implement an IT system. • Design, construct, and program embedded systems for specific activities and scenarios. • Delimit an open problem domain. • Solve problems through an analytical, engineering approach.
GBE-EBM1	Engineering Basic: Mechanical Design	5	The students should acquire knowledge about: - The SI unit system - Kinematics: velocity and acceleration in 1D and 2D, projectile motion - Dynamics: Newton's Laws, work, kinetic and potential energy.	After completing this course, the student will be able to: - Correctly use the SI-unit system and perform dimensional checks of calculations - Analyze and solve simple problems within kinematics and dynamics	The students should gain competences in: - Reading scientific text including formulae, graphs, diagrams etc. - Applying an analytical and systematic approach to simple, stylized engineering problems

Code	Title	ECTS	Knowledge	Skills	Competencies
					- Communicating simple calculations using concise language, formulae, and sketches
GBE-ECE1	Economics for Engineers	5	Upon completion of this course, the student will be able to: - Read and understand company financial reports - Explain how companies make decisions on investments and carry out risk assessments in connection with investment decisions - Identify methods for making calculations and assessments of investment proposals - Identify different options for raising capital for company investments - Explain methods for optimizing companies' use of working capital -	Upon completion of this course, the student will be able to: - Analyze and interpret company financial reports in a communication context. - Select and apply methods for making calculations and assessments of companies' investment proposals - Select and apply methods for analyzing the risk profile of companies' investment proposals - Use methods to measure company financial performance - Apply methods that can optimize companies' use of working capital -	Upon completion of this course, the student will be able to: - Carry out and present calculations of the return on an investment, perform sensitivity analysis and set up relevant scenarios and probability analysis. - Act as a constructive sparring partner for executives' who are responsible for decisions about strategic investments in and financing of capital equipment and or product/market development - Evaluate and present the financial consequences of an investment proposal. -
GBE-ENT1	Entrepreneurship	5	The student will obtain a profound understanding of how to use reflection in areas as innovation, entrepreneurship, establishing and qualifying a business identity, understanding complexity in business, leadership and projects generating value on entrepreneurial premises.	The student will be able to establish, identify and differentiate a business idea on practical as well as immaterial perspectives, have integrated the entrepreneurial way of working on personal-, team- and organizational level and be able to use many sources and perspectives for creating value in projects, idea generation etc.	The student will have acquired competencies to generate business ideas, qualify business ideas, reflect on operationalize business ideas. First, obtaining a fundamental knowledge of how entrepreneurship differs from more traditional ways of thinking about business and how to handle complexity in relation to business creation or change and personal characteristics related to the student and business partners.
GBE-GBC1	Global Business Communication I	5	The student should acquire knowledge about: - The international business environment - Communication models - The writing process - Approaches to writing routine, positive and negative messages in English	After the course the students should be able to: - analyse a communication situation as to target group, message, choice of communication channel etc. - communicate precisely and with a varied vocabulary in English, orally as well as in writing	The student should gain competences in applying selected relevant approaches when writing professional business messages in an international business environment and communicate effectively and professionally with a company's internal and external stakeholders in speech and writing.

Code	Title	ECTS	Knowledge	Skills	Competencies
			- Presentation techniques in English - Professional writing	- work out material to be used in a company's internal as well as external communication using correct terminology, syntax and stylistics - read and understand linguistically complex texts in English. - apply relevant terminology within business and technical subjects - present the results of self-studied subjects in English professionally.	Furthermore, the student should be able to critically acquire new knowledge within relevant engineering areas.
GBE-GBC2	Global Business Communication 2	5	After the course the students should be able to - identify approaches to writing persuasive messages in English. - identify requirements to project writing in English. - account for the conventions of technical writing in English. - describe different aspects of the semester theme. - account for different academic writing requirements in terms of syntax, coherence and structure.	After the course the students should be able to: - analyse a communication situation as to target group, message, choice of communication channel etc. - communicate precisely and with a varied vocabulary in English, orally as well as in writing. - apply different academic writing requirements in terms of syntax, coherence and structure. - discuss linguistically complex texts in English. - apply relevant terminology within business and technical subjects. - apply the conventions of technical writing in English. - present the results of self-studied subjects in English professionally. - write a project report in accordance with the guidelines. - present aspects of the semester theme orally in a clear and concise language -	Students should, in their project work, during their internships, and in their jobs as global business engineers, be able to: - apply selected relevant approaches when writing professional messages. - communicate effectively and professionally with a company's internal and external stakeholders, using correct terminology and syntactically correct structures in speech and writing. - interact and cooperate with people from different cultural backgrounds. - critically acquire new knowledge within relevant job-related areas
GBE-IBC1	Intercultural Business Communication	5	After the course the students should be able to - identify the basic structures, elements and functions of culture - cultural value dimensions - verbal and nonverbal intercultural communication	After the course the students should be able - to:explain how culture affects aspects of international communication and management. - acquire a better understanding of his/her own cultural conditioning.	Upon successful completion of this course, the student will be able to - identify, accept and adjust to cultural similarities and differences. - find, apply and evaluate literature and information in general on cultural practice in a country or

Code	Title	ECTS	Knowledge	Skills	Competencies
			- the importance of culture and intercultural communication in international business - business culture in selected areas in the world - intercultural management, leadership, teamwork, sales situations, negotiations, and conflicts. - knowledge of use of English language.knowledge of presentation techniques.	- distinguish the major dimensions which define cultural differences among societies or groups. - recognise the cultural variables in the communication process and what factors can cause noise in the process. - successfully manage cross-cultural communications, sales and negotiation situations. - express themselves fluently and accurately in presentation, conversation and discussion in oral English language.be able to apply presentation techniques and present a topic in nuanced and well-structured English language.	region .apply effective communication strategies depending on situation, context and culture. - act in different international environments in connection with sales and negotiation situations. - express themselves fluently and accurately in oral English language.be able to apply presentation techniques in a professional way.
GBE-INP1	Engineering Internship (GBE-)	30	The student must: • gain knowledge of theory, methodology and practice within a profession or one or more fields of study • be able to understand and reflect on theories, methodology and practice • be aware of non-technical – societal, health and safety, environmental, economic and industrial – implications of engineering practice.	The student must: • be able to apply the methodologies and tools of one or more fields of study and to apply skills related to work within the field/fields of study or profession • be able to assess theoretical and practical problems and to substantiate and select relevant solutions • be able to communicate professional issues.	The student must: • be able to handle complex and development oriented situations in study or work contexts • be able to independently participate in professional and interdisciplinary collaboration with a profes-sional approach • be able to identify own learning needs and to organise own learning in different learning environments • promote an engineering-oriented approach during the remaining semesters on the Bachelor pro-gramme • develop personal skills required for the professional career as engineer • form the basis for developing personal/professional network
GBE-MATx	Engineering Mathematics	5	After the course the students should be able to solve simple mathematical problems within the areas of: • Basic order of operations: solving linear equations and fraction rules	After the course the students should be able to: • analyse simple problems within 2D vectors and differential calculus,	In their project work, during business and engineering courses which are part of the global business engineering programme, and in their future jobs as global business engineers, the students should be able to:

Code	Title	ECTS	Knowledge	Skills	Competencies
			• Functions: Logarithmic, exponential and trigonometric functions including laws of exponents • Vectors in 2D: Order of operations, scalar, angle, magnitude, determinant, area, equations, perpendicularity, parallelism, lines, decomposing of a vector. • Differential calculus: Power rule, chain rule, product rule, quotient rule, tangent, exponential, logarithmic and trigonometric functions. • Integration: Power rule and definite integrals. • Number sets • Number systems	• apply relevant terminology within basic mathematical subjects.	•Apply mathematical knowledge in solving specific problems
GBE-SEP1	Semester Project 1 (GBE-)	5	**Project method learning objectives:** The students must be able to: Effective teams - explain included theories about group dynamics, team collaboration and conflict resolution. Own learning process - refer to involved theories of learning, motivation, feedback and study techniques. Project framework - identify relevant knowledge in relation to academic and technical written communication, including the report's structure, references and source management. - identify relevant presentation techniques for the target group, as well as use presentation techniques. PBL - explain basic elements of PBL. - identify relevant issues and specific requirements for a problem formulation.	**Project method learning objectives:** The students must be able to: Effective teams - jointly formulate and apply a group contract in the group work. - enter into and establish collaboration with the project group and supervisor. Own learning process - apply knowledge of learning theory and motivation theory in connection with own learning process and give and receive feedback. Project framework - act in a source-critical way as well as use references and source management, including rules for plagiarism. - communicate the results of the project work and the project group's learning process in a structured way using professional concepts, both in writing and graphically. - communicate in writing to different	**Project method learning objectives:** The students must be able to: Effective teams - describe and reflect on the project group's collaboration - including their own efforts - to define opportunities for improvement for future projects. Own learning process - reflect on their own ability to learn through the various teaching activities, including the project group's work. Problem-based learning - take responsibility for the student-led part of the semester project **Professional learning goals** The students must be able to: Engineering Basics Software (EBS) - reflect on the development of a software system for a specific purpose. - plan and execute a software development process

Code	Title	ECTS	Knowledge	Skills	Competencies
			Project management identify relevant project management methods, including planning, meeting management, risk assessment and quality assurance **Professional knowledge learning goals** The students must be able to: Engineering Basics Software (EBS) - identify and describe the different stages of a software development process. - explain the functionality of a software system. - describe and give examples of software systems. Business Economics (BUE) - identify and describe macroeconomic characteristics and development trends for a given country. Global Business Communication 1 (GBC1) - account for theoretical and practical knowledge about how companies communicate professionally both internally and externally. - explain relevant aspects in written presentation techniques.	target groups. Problem-based learning - set up a problem formulation, describe different solution options and explain solution proposals. Project management - explain the choice of and use of tools and methods for project management in order to achieve concrete goals in the project work. **Professional learning goals** The students must be able to: Engineering Basics Software (EBS) - analyze a problem area in order to derive requirements.design and build a software system. - develop software to control a robot. - use dynamic models to describe the behavior of a software system. - perform tests in relation to derived requirements. - apply a project methodology to structure the development work Business Economics (BUE) - identify and analyze the macroeconomic policies pursued in a given country and its significance for companies' decisions to outsource production and development tasks to that country. Global Business Communication 1 (GBC1) - structure and formulate a written project report in English on the semester project's problem formulation, solution proposals and conclusion in clear and precise English using correct subject	Business Economics (BUE) - plan and carry out a macroeconomic analysis of a given country. - reflect on the importance of macroeconomic conditions in a given country in connection with decisions and outsourcing Global Business Communication 1 (GBC1) - reflect on their own ability to communicate in writing in English on behalf of a company using correct subject terminology. - reflect on collaboration across cultures.

Code	Title	ECTS	Knowledge	Skills	Competencies
				terminology, grammar and syntax. - structure and describe a process report on the work on the semester project in clear and precise English.	
GBE-SEP2	Semester Project 2 (GBE-)	10	Project method learning objectives: The students must be able to: Effective teams - refer to knowledge about own strengths and weaknesses in connection with group work - include theories about personal profiles and personal and interpersonal competencies as well as cultural differences Project management - identify relevant project management methods, including planning, meeting management, risk assessment and quality assurance. Professional knowledge learning goals The students must be able to: Mechanical Engineering Basic (EMB1) Product development - set specifications in terms of physical measurements and properties - analyse and apply experimental results in calculations Presentation - convey technical knowledge in the form of calculations in a readable structured form Marketing Management (MAM1)how to develop and prepare a marketing plan Global Business Communication 2 (GBC2)explain how a project report is	Project method learning objectives: The students must be able to: Effective teams - identify and describe the group's development. - apply reviewed theories on personal profiles as well as cross-cultural aspects in group collaboration in order to describe any conflicts in group collaboration and find possible solutions to them. Own learning process - describe needs in relation to one's own motivation for learning and act accordingly. - identify and apply preferred study techniques.set and reflect on own learning goals from the current and previous semester in the process report with a view to future improvement. Project framework - communicate the results of the project work and the project group's learning process in a structured way using professional concepts, both written, graphic and oral. - apply knowledge of references and source management. PBL - describe the factors that influence the individual and group-based learning in the PBL course. - work on the basis of the project group's own problem formulation.	Project method learning objectives: The students must be able to: Effective teams - take responsibility for the collaboration in the group and actively use and further develop the group contract. - set up and select development and action opportunities in relation to the group's development. Own learning process - independently give and receive constructive feedback in connection with one's own and others' learning process. - independently adapt own learning process based on experience and knowledge of own preferences. Project framework - work methodically and structured with the semester project in the project group. - Project-based learning - take responsibility for the student-led part of the semester project. Project management - take responsibility for the management of the project work with continuous adjustments between tasks and resources.

Code	Title	ECTS	Knowledge	Skills	Competencies
			communicated in writing in professional English with the correct use of subject terminology.explain relevant aspects in oral and written presentation techniques	- work interdisciplinary. Project management - use profession-related methods and tools in project work. - use digital tools such as Office tools, digital project management as well as digital tools and portals. - Professional learning goals The students must be able to: Mechanical Engineering Basic (EMB1) - select and apply what is applicable from syllabus - use idea generation tools in practice. - apply skills from the subjects: - Compile free body diagrams - do a 3d modelling - structure a presentation of calculation - Marketing Management (MAM1) - Analyse a market by collecting relevant data relating to macro trends (PEST analysis) and trends in the micro environment (competitors and customers) - Segment a market based on relevant segmentation criteria - Select a target group based on a fit between company competences and market profitability - Summarize the market analysis using the SWOT analysis - develop a marketing mix taken the chosen strategy into practice (target group, positioning and competitive advantages). Global Business Communication 2 (GBC2) - plan and analyse the communication situation	Professional learning goals The students must be able to: Mechanical Engineering Basic (EMB1)make a physical measurement of a product based on an analysis of movement.provide a structured presentation of drawings and calculations Marketing Management (MAM1) Develop a competitive marketing plan including strategic reflections, target market selection, an appropriate competitive strategy and a suitable marketing mix based on conclusions from the market analysis Global Business Communication 2 (GBC2)reflect on own ability to communicate in writing and orally in English on behalf of a company using correct subject terminology.reflect on collaboration across cultures.

Code	Title	ECTS	Knowledge	Skills	Competencies
				- structure the project report, and organize the text in logical, coherent sections. - write the project report in a professional style used in business communication and according to the guidelines for writing reports in VIA - use grammatically correct written English - present the results of the project work orally in a clear and concise language	
GBE-SEP3	Semester Project 3 (GBE-)	10	Project method learning objectives: The students must be able to: Effective teams refer to involved theories in order to increase efficiency for the group as a whole but also for the individual student Professional knowledge learning goals The students must be able to: Mechanics (MEC1), Material and Manufacturing Technology (MMT1) Product development set specifications in the form of requirements, criteria and properties and can use idea generation methods - unsystematic (e.g. Brainstorming) and systematic (e.g. Morphology). Presentation convey technical knowledge in the form of drawings and calculations in a readable structured form Software Development with Java (SDJ1) use the knowledge acquired in SDJ1 Marketing Management 2 (MAM2)develop and prepare an international marketing	Project method learning objectives: The students must be able to: Effective teams plan the project group's process focus on the group's learnings and goals identify and apply methods for solving basic cross-cultural communication and collaboration problems. Own learning process describe and analyse own learning process in the process reportseek, find and incorporate relevant knowledge set and reflect on own learning goals from current and previous semesters in the process report with a view to future improvement Project framework communicate the results of the project work and the project group's learning process in a structured way using professional concepts, both written, graphics and verbally.argue for the choice of sources and references in	Project method learning objectives: The students must be able to: Effective teams apply own experience and knowledge to strengthen group collaboration receive and reflect on guidance and facilitation of group collaboration take responsibility for structuring and adapting the form of collaboration to the members' personal and interpersonal competencies Own learning process independently plan, structure and optimize own learning process on the basis of previous courses Project framework in collaboration with the group, to take responsibility for the work process in connection with report writing and presentation .use verbal, digital and graphic project presentation techniques Problem based learning work analytically, methodically and structured with the semester project in

Code	Title	ECTS	Knowledge	Skills	Competencies
			plan including international market selection Intercultural Business Communication (IBC1)explain the importance of culture and intercultural communication in international business situations.	connection with the project work. Problem-based learning analyze and explain overall contexts.work with a holistic view of the project, the subjects and the outside world. work interdisciplinary. Professional learning goals The students must be able to: Mechanics (MEC1), Material and Manufacturing Technology (MMT1)select and apply the syllabus from the subjects use idea generation tools in practice apply skills from the subjects compile free body diagrams perform equilibrium calculations choose dimensions, design and functionality choose material and production methods perform 3d modelling perform structured presentation of calculations Software Development with Java (SDJ1)explain the Waterfall method as a software development processderive requirements apply use case modelling and draw activity diagrams draw a domain model construct class diagram(s)draw a sequence diagram of one essential method	the project group. Project management plan, adapt and optimize a project process with appropriate project management tools. account for the use of digital tools such as digital project management as well as digital tools and portals. Professional learning goals The students must be able to: Mechanics (MEC1), Material and Manufacturing Technology (MMT1)perform static calculations select correct material and manufacturing methods provide a structured presentation of drawings and calculations Software Development with Java (SDJ1)Demonstrate the connection between the different stages in software development Marketing Management (MAM2) select potential new export markets by conducting an international market screening analyse a foreign market, decide on a marketing strategy and implement an international marketing plan Intercultural Business Communication (IBC1)find, apply and evaluate literature and information in general about cultural practices in the relevant export market

Code	Title	ECTS	Knowledge	Skills	Competencies
				implement a software system using object-oriented programming perform testing in relation to the derived requirements describe how to use your system in a user guide Marketing Management 2 (MAM2)select a new market according the to international market screening model make an analysis of a market for the selected country develop a marketing strategy for the company complete an international marketing plan including recommendations to the company for a possible entry into the selected market Intercultural Business Communication 1 (IBC1)identify intercultural aspects on the selected export market that may influence the entry to the market .recommend which strategies should be used to build a good relationship with local partners and employees	provide management with suggestions on cultural aspects to be considered when entering a new export market
GBE-SEP4	Semester Project 4	10	Professional knowledge learning goals The students must be able to: - Demonstrate knowledge of theories, models and methods from current and previous semesters courses for the solution of the semester project assignment, including:3D drawing (CAD)Programming software using Java and relational databases - Thermodynamics and electrical circuits - Calculations of profitability in connection with capital investments	Professional learning goals The students must be able to: - Choose theories, models and methods from relevant courses from current and previous semesters and apply them in a form that is both relevant and rational in relation to the solution of the semester project assignment - Project method learning objectives: The students must be able to:	Professional learning goals The students must be able to: - Select, combine and adapt theories, models and methods from current and previous semester's courses and apply them in a form that is usable, relevant and rational in relation to the solution of the semester project assignment -

Code	Title	ECTS	Knowledge	Skills	Competencies
			- Project method learning objectives: The students must be able to: o Explain personal characteristics and attitudes o Demonstrate awareness of own personal knowledge, personal skills and attitudes as well as show responsibility for improving in order to overcome personal weaknesses.	o Own learning process: Set and reflect on own learning goals from current and previous semesters in the process report with a view to future improvement - Project framework: o Communicate and argue for the results of the project work and the project group's learning process in a structured way using professional concepts, both written, graphic and oral. o Argue for the choice of sources and references in connection with the project work. - Problem-based learning: o Explain ethical considerations in the project work. Work with a holistic view of the project, the courses and the outside world.	Project method learning objectives: The students must be able to: Effective teams: Plan, structure and achieve effective collaboration in groups through reasoned choices of working methods and adapted collaboration methods Analyze and reflect on connections between knowledge sharing in the project group and the quality of the project work Own learning process; Analyze own learning needs and independently structure own learning process Independently and critically apply relevant and valid knowledge Project framework; Independently explain new knowledge and argue for application in connection with the project work. Problem based learning; Work analytically, methodologically and in a structured way with the semester project in the project group. Project management; Combine, adapt and optimize project management methods in order to optimize the project process. Explain the use of digital tools for project management as well as digital

Code	Title	ECTS	Knowledge	Skills	Competencies
					knowledge collection tools and portals.
GBE-SEP5	Semester project 5 - Market Research & Product Development	10	Selection of theories, models and methods from the subjects in relation to the solution of the semester project assignment. • Sustainability and circular development • Pretotyping and needs analyses • Business plan • Project planning	The students must be able to: • Choose theories, models and methods that are relevant to the problems in the project • Design, dimension and document machines / software in accordance with rules and regulations • Demonstrate self-initiative, interpersonal skills, criticism, self-criticism, desire to learn	The student must: • use relevant project management tools • define, manage and implement interdisciplinary projects via a project plan (the project description) • apply market analysis input to the technical solution and vice versa • develop technical sustainable solutions that both meet the market's needs and have business potential and circular designed
GBE-SEP7	Sustainable product development	10	**Professional Learning objectives:** Students will achieve knowledge within the areas of: ▪ Technical theory & methods from selected specialization (ICT/ME/Climate) relevant for the project in question ▪ Business development and strategy theories and methods relevant for the project in question ▪ Sustainable product and business development ▪ Key dimensions of project management skills in groups. **Project method learning objectives:** The students must be able to: ▪ Explain personal characteristics and attitudes ▪ Demonstrate awareness of own personal knowledge, personal skills and attitudes as well as show responsibility for improving in order to overcome personal weaknesses.	**Professional Learning objectives:** After completion of the project, the students must be able to: ▪ Evaluate the relevance and importance of sustainability in relation to both product and business development strategies ▪ Apply relevant project methodology and project management tools in a cross-cultural/disciplinary context. ▪ Choose and apply relevant technical tools and methods from the selected specialization (ICT/ME/Climate) to solve a specific product development task. ▪ Outline an implementation plan for a project in a cross cultural context, and revitalize the global partnership for sustainable development. **Project method learning objectives:** The students must be able to:	**Professional Learning objectives:** After completion of the project, the student should be able to: ▪ Give recommendations to how attention to environmental and social compliance in product and business development can be used in strengthening the strategic positioning of a company. ▪ Identify and solve cross-disciplinary problems in a group project ▪ Plan and implement a project plan in a cross-cultural context ▪ Formulate a solid Project Description for the 9th semester Bachelor project **Project method learning objectives:** The students must be able to: Effective teams • Plan, structure and achieve effective collaboration in groups

Code	Title	ECTS	Knowledge	Skills	Competencies
				Own learning process • Set and reflect on own learning goals from current and previous semesters in the process report with a view to future improvement Project framework • Communicate and argue for the results of the project work and the project group's learning process in a structured way using professional concepts, both written, graphic and oral. • Argue for the choice of sources and references in connection with the project work. Problem-based learning • Explain ethical considerations in the project work. • Work with a holistic view of the project, the courses and the outside world.	through reasoned choices of working methods and adapted collaboration methods • Analyze and reflect on connections between knowledge sharing in the project group and the quality of the project work Own learning process • Analyze own learning needs and independently structure own learning process • Independently and critically apply relevant and valid knowledge Project framework • Independently explain new knowledge and argue for application in connection with the project work. Problem based learning • Work analytically, methodologically and in a structured way with the semester project in the project group. Project management − Combine, adapt and optimize project management methods in order to optimize the project process. − Explain the use of digital tools for project management as well as digital knowledge collection tools and portals.
GBE-MAM1	Marketing Management 1	5	The students are introduced to core theories and models within marketing management to have knowledge about: - use and limitations of macro and micro environmental analysis - the competitive environment in which the company operates - how to develop a cohesive marketing strategy for companies operating in B2B and B2C markets - customer value, satisfaction and loyalty as the basis for all successful marketing strategies	At the end of this course, and having completed the essential reading and activities, the students should be able to: - apply core theories and models within marketing management to practical marketing problems while acknowledging their use and limitations - perform a macro environmental analysis	After a successful completion of the course the student will have the competencies to: - identify, analyse and evaluate a company's strength and weaknesses in a relevant external marketing environment - use dimensions of BTB and BTC customer behaviour in marketing planning - analyse and evaluate strategic marketing challenges in relation

Code	Title	ECTS	Knowledge	Skills	Competencies
			- customer behaviour and how purchase decisions are made at the individual, group and organizational level - dimensions of sustainable marketing and corporate social responsibility - market segmentation criteria, target group definition and what constitutes a competitive marketing positioning strategy - how to develop a marketing mix.	- perform a competitor analysis regarding identification of competitors, their goals, strategies and marketing mix - perform an industry analysis on attractiveness - identify key markets and customer trends with their possibilities and threats - analyse customer behaviour in both consumer and business markets, determine customer needs and determine how product purchase decisions are made - identify elements of sustainable marketing in a company's marketing strategy - segment markets in order to determine appropriate target groups and to develop a fitting strategy and positioning to cover their needs while being competitive - identify and chose amongst alternative growth strategies execute the strategy with an effective marketing mix comprising concepts such as brand equity, product strategy, product life cycle management, service management for services, choosing an appropriate pricing strategy, managing distribution channels and mass/personal/digital communication	to overall market trends and developments - examine marketing approaches to sustainable marketing - design a competitive marketing strategy encompassing segmentation, target group definition and positioning - identify, discuss and recommend a marketing mix to a given strategic market situation
GBE-MAM2	Global Marketing Management	5	The students are introduced to core theories and models within marketing management to have knowledge about: - The difference between global, glocal and local international marketing strategies - The steps in the international marketing process and the complexities of the international marketing environment - The current state of global marketing, the forces driving globalization and	At the end of this course, and having completed the essential reading and activities, the students should be able to - Perform a market profile of a country by conducting a PEST and market analysis (Macro & Micro factors)Critically evaluate a company's international marketing environment and its current strategy	After a successful completion of the course the student will be able to: - Identify global market opportunities and assess the associated risks - Conduct a detailed country analysis including both macro and micro market factors - Quickly and effectively research market opportunities and to apply relevant country selection

Code	Title	ECTS	Knowledge	Skills	Competencies
			the resulting challenges for both existing international companies and for domestic companies planning to start an internationalization process - The specific problems associated with international marketing and the internationalization process - All aspects of international marketing strategy development and the international marketing planning process - The sustainable global value chain, Corporate social responsibility and triple bottom line - The differences in social/cultural conventions that affect buyer behaviour and marketing strategies in international markets - Internationalization strategies for both small and large companies - Conducting effective search, screening and selection of new countries to enter - The complete range of market entry methods and their advantages and disadvantages - International marketing mix strategies	- Access the opportunities and risks associated with initiating an international market strategy or expand an already international presence to new countries for both small and large companies - Provide input to international market expansion strategy development - Assess how CSR and sustainability can contribute to a company's value chain practices and improve the competitiveness - Decide which markets to enter and evaluate the pros and cons of different entry modes - Design an international marketing mix including the ability to determine which parts of the marketing mix will require adaptation and to which degree	screening and segmentation criteria - Develop a global marketing strategy and prepare an international marketing plan that is aligned with the objectives and competencies of the company (including sustainability and CSR) - Analyse and determine the most appropriate method of market entry
GBE-MST1	Strategy, Organization and Management	5	After the course, the students should be able to: • Describe organizational behavior and structures • Define the concept of management and leadership including the different styles of management and leadership • Identify the basic issues of business strategy • Describe the elements of the strategic planning process and a range of strategic tools.	After the course the students should be able to: • Evaluate, design, and choose appropriate organizational structures • Evaluate and choose relevant management and leadership strategies • Apply methods for organizational change processes • Analyze the external macro and micro environment in the context of business strategy making • Analyze the internal environment in the context of business strategy making • Summarize strategic options	After the course the students should be able to: • Compare and discuss the basic issues of management and leadership • Evaluate and apply the appropriate kind of management/leadership in a given situational context • Compare and discuss the basic issues of business strategy • Apply different strategic tools Apply methods for implementation of a strategic planning process in an organizational context

Code	Title	ECTS	Knowledge	Skills	Competencies
				Explain how to design, evaluate, choose and implement appropriate business strategies	
GBE-PHY1	Mechanical Physics	5	The students should acquire knowledge about: **DC electricity:** oElectric charge, electric potential, current and resistance, Ohm's law, electric power, circuit analysis, solar panels. **Thermodynamics:** oTemperature and heat, phase changes and heat transfer, the ideal gas equation	After completing this course, the student will be able to: •Solve simple exercises in electrostatics •Analyze simple DC circuits •Solve simple exercises in amount of substance •Understand basic heat transfer •Solve simple exercises in thermodynamics	The students should gain competences in: •After completing this course, the student must be able to apply the acquired knowledge and skills in simple real-world problems, in order to follow more advanced courses within electricity and thermodynamics.
GBE-PRM1	Project Management	5	The students will be able to: • Apply the planning process method to a complex project • Describe and explain what it takes to manage and run a complex project	The students will be able to use the methodology and tools for… • Estimating Project Time and Costs • Planning a Project • Using Risk Management • Conducting Team Management • Completing a project	During the course the students will work with analysis of a real time project and by applying acquired theoretical knowledge being able to outline used methods and tools including: • Project Description / Scope • Project plan • Project organization • Risk Analysis • Communication plan based on stakeholder analysis All leading to successfully managing and controlling a project. .
GBE-PMA1	Product Management	5	After the course, the students should be able to: - Define what is a Product, a Product Line, a Product Portfolio, Product Elements, Modules and Platforms in relation to both software and more tangible products.	After the course the students should be able to: - Explain and evaluate relevant Product Management tools and processes Explain how to design, evaluate, choose and implement	After the course the students should be able to: - Compare and discuss the basic issues of Product Management in an organizational context

Code	Title	ECTS	Knowledge	Skills	Competencies
			- Understand the roles and responsibilities as a Product Manager - Describe the elements of the product management planning process and a range of product management tools.	appropriate Product Management tools and strategies - Understand product development concepts and expectations for Product Managers	- Evaluate and apply the appropriate Product Managements tools and models - Apply methods for implementation of a Product Master plan planning process in an organizational context
GBE-SSM1	Personal Selling and Sales Management	5	- The different kinds of sales jobs and personal characteristics of successful sales persons - Understand the significance of personal selling to the sales of the company, its relation to other the other elements of the promotion mix of the company and its marketing strategy - The connection between the purchasing behavior of the customer and the right sales strategy - The buying center concept and factors affecting the customer decision-making process - Prospecting: how to find new sales leads and methods to qualify them as potential customers - A deep understanding of the key phases in the personal selling process: 1. The opening at a sales meeting 2. Need and problem identification 3. Presentation and demonstration of relevant solution 4. Effective techniques to deal with buyers' objections 5. To negotiate a deal 6. Techniques to close a sale (get the order) 7. Follow-up on the sales meeting	- Create a prospecting plan to find new customers - Plan and design the sales meeting by finding and using relevant information - Determine the members of the 'buying center', their needs and purchase motivations - How to determine customer value and create a strong value proposition - Prepare and present a sales presentation in a convincing manner - Be effective in sales negotiation and handling of objections - Be able to close a sale Manage customer relationships to maximize long term customer satisfaction	- Be able to effectively prospect for new customers - Overall to plan and conduct a professional sales meeting covering all the steps in the process from the opening over need and problem identification, presentation, handling of objections, negotiation, closing the sale to follow-up on the meeting - Prepare and conduct a sales presentation: visual, verbal, and nonverbal communication of information using professional selling skills - Use an appropriate selling strategy according to the needs of the customer, the characteristics of the product in question, the competition and the objectives of the selling company - Be effective in building, maintaining and extending customer relationships Function as the market expert regarding information on products and competitors to both the selling and the buying organization

Code	Title	ECTS	Knowledge	Skills	Competencies
			- Basic knowledge about sales organization and sales administration including international aspects - Define customer value from the buyers perspective - How to transform product features into customer benefits - Building, maintaining and extending customer relationships Awareness of ethical practices in personal selling		
GBE-WS1	Workshop: Know Your Profession	0	The student must obtain knowledge about what job opportunities are available as a graduate and what requirements are set for these	The student must obtain sufficient knowledge about what the education can be used for so that decisions can be made about, among other things. stays abroad and electives	The student must be able to prepare a relevant and focused job application, pitch their profession and structure a career path
GBE-WS2S	Workshop: Working with Data in Python	0	-	-	-
IP-DAT1E	Data Analytics	5	- Account for reproducibility in statistical analytics - Compare different data storage formats - Explain the difference between structured and unstructured data - Explain basic statistical concepts - Explain reasons for anomalies in data - Reflect on data quality in a given data set - Compare different scales - Explain different methods for analytical data processing - Explain basic concepts in data processing -	The student can: - Load data from different file formats - Apply principles of reproducibility in data analytics - Develop a data analytical strategy for a given problem - Carry out basic statistical analytics - Communicate results of data analytics - Select visual charts to support data analytics - Experiment with data collection methods - Provide reasonable choices in connection with analytical data processing - Perform basic probability calculus - Calculate basic statistical key values	The student can: - Independently plan a data analysis of a given problem - Interpret the results of a data analysis - Develop hypotheses - Test hypotheses - Assess the quality of a data analysis - Make informed choices in connection with data analysis

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IP-DIG2E	Digitalization	5	After the course, students can: - Describe (solo3) the industrial development through the 4 industrial revolutions. - Describe (solo3) the connection between digitization and Industry 4.0 - Describe (solo3) the (enabling) role of digitization technologies in a production, business and industrial context - Defines (Solo2) Digitization I4.0 technologies and lists (solo2) technologies' core characteristics, their advantages and disadvantages and historical development and maturity	After the course, students can: - Describe (solo3) or outline (Solo3) the potential of a technology in a given context.Combine (solo3) new digitization technologies with existing technology.	The purpose of the course is to provide students with an understanding, a language and skillset that enable the student to participate in value-creating digitization projects.
IT-DAI1	Data Analytics Infrastructure	5	Having completed this course, students should be able to describe basic techniques within the field, and argue the choice and applicability of these for different use scenarios. This includes: • Application of analytical data processing, and differences to transactional processing • Types of analytical data processing, such as reporting and visualization • Sources of data for analytical processing • Server and locally hosted platforms for data storage and analytical processing • Modelling techniques for designing data models for integration of multi-source data, including structured, semi-structured and unstructured data, and for modelling time-variant data/history • Design of systems for data acquisition, validating and cleansing data, integration and publishing of data.	Having completed this course, students should be able to: • Design and implement data models for integrating multi-source data, including dimensional data modelling, for structured and semi structured data • Design and implement data models for time-variant data • Design, implement and test systems for data acquisition, validation, integration and delivery from multiple sources and platforms • Design, implement and test basic descriptive statistical analysis on integrated data • Design, implement and test basic visualizations and graphs of data and analysis results. • Give relevant peer feedback on handins and exercises throughout the semester	Having completed this course, students should be able to • Discuss and argue pros, cons and trade-offs of choices • Use basic statistics and visualization to find and explain patterns of information in data • Evaluate and act upon peer feedback
IT-DBS1	Database Systems	5	Having completed this course, students will be able to:	Having completed this course, students will be able to • use relational modelling to model	Having completed this course, students will be able to: • Design and implement a database

Code	Title	ECTS	Knowledge	Skills	Competencies
			• account for the relationship between relational algebra and SQL • define the relational model • distinguish the 3 normal forms • classify keys in relational databases • explain indexes	business cases • use UML to document ER-Models • use Data Definition Language (DDL) to create databases • use Data Modeling Language (DML) to manipulate data in a database • use the mapping method to convert ER-Models to Relational Models • use normalisation to normalise a database schema to 3rd normal form • create SQL statements to create, replace, update and delete data in a database • use keys in relational databases • use joins to combine data • use transactions to prevent data corruption • create triggers • create views	schema on the 3rd normal form • Use a database in application development
IT-DIM1	Digital Multi Media	5			Having completed this course, students should have profound knowledge of: • Computer Graphics • Design Principles for multimedia • Video, Animation and Sound • XML and Multimedia
IT-DND1	.NET Development		The student will be able to: - Describe the fundamentals of .NET development and the common type system - Identify and describe .NET technologies relevant to application development	The student will be able to: - Write and debug C# code - Navigate and use the managed .NET API - Create and consume class libraries - Implement and consume RESTful web services - Utilize asynchronous programming - Implement web applications within ASP.NET - Create and interact with relational databases using an object-relational mapping library - Compare object-relational mapping to traditional data access techniques	The student will be able to: - Develop console applications, web applications and web services with - Server-side and client-side C#-programming - Data persistence using object-relational mapping - User management, including authentication and authorization - Analyse and evaluate the relevance of .NET technologies when designing software applications

Code	Title	ECTS	Knowledge	Skills	Competencies
				- Define and implement basic authentication and authorization	
IT-ERP1	ERP systems SAP ABAP/4 Programming	5	Having completed this course, students will be able to: - Understand the ABAP Workbench. - Create basic ABAP Programs. - Understand the control flow and structures in ABAP	Having completed this course, students will be able to: - Create Database with domains, data elements and tables - Retrieve Data from the Database with open sql. - Develop a simple ABAP Programs with modularization. - Develop a DYNPRO with navigation (CRUD-functionality) - Develop reports with selection screen, alv-list, etc.	Having completed this course, students will be able to: - Use the fundamental concepts of the ABAP programming Language - Create simple application programs with user dialogs and database connections. - Trace the flow of a program and troubleshoot simple problems. - Describe change management for new systems. - Use ABAP Workbench and basic ABAP language elements. - Explain the relationship and difference between the classical procedural programming model and the object-oriented programming model in ABAP/4. - Apply screen flow logic and working with external data. - Apply different tools and techniques available to implement dataflow in an ABAP program with database. - Design and implement an object-oriented SAP application with a database and ALV Grid.
IT-IDX1	Interaction Design	5			Gain skills within interaction design and usability evaluation. You will achieve: knowledge of and experience in User eXperience Design (UX)including knowledge of and experience in par-

Code	Title	ECTS	Knowledge	Skills	Competencies
					ticipatory design work-shopsknowledge on planning, preparation, implementation, analysis, and documentation of user-based usability evaluationunderstanding of and practical experience with the interplay between usability evaluation and interaction design in an iterative design process
IT-UXU1	User Experience and Usability	5	Upon completion of this course, students will be able to: - Explain how sensed elements (colors, typography, imagery) evoke emotions - Explain emotional design using a 3 layer model - Recognize the significance of usability testing - Recognize the impact of cognitive load on usability.	Upon completion of this course, students will be able to: - Recognize common cognitive processes (e.g., perception, attention, memory). - Identify cognitive biases that impact user behavior. - Conduct usability tests with real users using both controlled and natural settings - Analyse user feedback to improve a design using Instant Data Analysis. - Discuss the impact of emotional engagement on user behavior.	Upon completion of this course, students will be able to: - Compare emotional design across different platforms (web, mobile, physical products) - Reflect on the impact of authentic storytelling in product narratives - Propose innovative emotional design solutions for specific contexts - Reflect on the emotional impact of design choices. - Compare different settings in usability testing - Evaluate the impact of design decisions on user satisfaction. - Discuss ethical considerations in UX design. - Apply advanced thinking and creativity in understanding the user's desire and behavior - Propose innovative solutions for enhancing social interactions in digital products.
IT-MAL1	Introduction to Machine Learning	5	After having successfully completed the course, the student will have gained knowledge about algorithms, methods, techniques, tools, and applications within	After having successfully completed the course, the students should be able to apply the algorithms, methods and models from the above-mentioned	After completion of the course, the goal is that the students have acquired the competences to:- Make in-

Code	Title	ECTS	Knowledge	Skills	Competencies
			the following fundamental machine learning methods: - predictive methods, e.g. regression and classification - descriptive methods, e.g. clustering and PCA - deep learning methods, e.g. neural networks. - clustering methods, e.g. partitional and hierarchal clustering The students must be able to relate critically and reflectively to the above topics; in particular, it is important that they become proficient in selecting the right type of machine learning method for use in a given context.	areas to identify, analyse, evaluate and make suggestions for solving specific data-based issues. They must be able to argue for the relevance of the chosen algorithms as well as for the proposed solution. In addition, they must be able to reflect on the importance of the context in which the solution is included. Specifically, it is expected that after completion of the course the students will be able to: - Understand and apply a number of machine learning algorithms to both unstructured and structured data examples - Understand and compare the algorithms behind different data mining and machine learning methods - Match and possibly combine methods for practical use in an appropriate context.	formed choices about the use of machine learning techniques - Parametrisise machine learning algorithms for a given data material - Design and develop a complete solution for a complex, realistic problem - Communicate and discuss the solutions with professionals and non-specialists.
IT-PRG1	Introduction to Programming for Engineers	5	Account for the following basic programming concepts: - data types - operators - variables - control structure - conditions - loops - functions - recursion - exceptions - inheritance Demonstrate knowledge about the following basic algorithmic techniques:	- Use basic programming concepts and simple algorithmic techniques - Prepare an engineering problem into sequences that can be transferred to code - Prepare simple programs and applications that can automate engineering tasks - Use standard libraries for engineering purposes	- Create well-structured programs and perform testing of these - Create programs and scripts for solving engineering problems

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			- Sorting - binary search Additionally, the student will be able choose an appropriate method for - file-based input/output - testing and debugging		
IT-SDJ1	Software Development with UML and Java	10	The student should be able to: • Identify the Java lexical structures: key-words, separators, operators, identifiers, literals and comments. • Explain details of UML class diagrams. • Identify selection and loop structures in UML activity diagrams.	The student should be able to: • Construct Java programs with proper choice of selection and loop structures. • Create and use objects in Java. • Implement classes in Java using the object oriented concepts: encapsula-tion, inheritance and polymorphism. • Implement one-to-one relations and differentiate between association, ag-gregation and composition. • Implement one-to-many relations us-ing array structures and a simple col-lection class. • Implement exception handling for dif-ferent types of exceptions. • Implement persistence in text and bi-nary files. • Construct simple event-based GUI applications. • Construct Java source code docu-mentations. • Interpret UML class diagrams, and construct corresponding Java code.	The student should be able to: • Exemplify and discuss basic object-oriented concepts, including encapsu-lation, relationships, inheritance and polymorphism • Implement small scale systems from UML class diagrams.
IT-SWE1	Software Engineering (IT-)	5	The student should be able to account for: • Abstraction • UML (selected diagrams) • S.O.L.I.D principles • Unified Process • Scrum • Design principles	The student should achieve the skills to: • Analyse a problem and document the analysis- and design-process with text and UML • Apply use of Scrum • Apply use of Unified Process	The student should be able to: • Analyse a problem– what is the problem to be solve? • Derive a requirement specification with Use Cases and non-functional re-quirements • Plan tests by Test specifications

Code	Title	ECTS	Knowledge	Skills	Competencies
			• Architectural design • Requirement capturing • Analysis vs. Design models • The difference between software development and coding • Test descriptions • How to conduct a test following a test description	• Use UML to document requirements, analysis, and design artefacts • Use agile software development with Unified Process in combination with Scrum • Create a Domain model from a problem description, requirement specification and understand the elements in the resulting Domain model • Create a design model and understand the elements within it • Apply the S.O.L.I.D principles on a design model • Design for test • Create test descriptions • Create architectural design models	• Analyse and design a project to be implemented in teams with many participants and stakeholders • Work in a Scrum team
IT-WEB1	Web Development	5	Having completed this course, students will have the knowledge to: • Describe the different file formats used in web development and their purpose. • Reproduce webpage layouts using HTML5 and CSS3 when presented with images/screenshots of other websites. • Select appropriate attributes for HTML5 elements. • Explain the difference between responsive and non-responsive websites. • Test HTML5 files for errors using the W3C markup validator. • Account for the difference between the JavaScript and Java programming languages.	Having completed this course, students will have the skills to: • Create web sites using Hyper Text Markup Language (HTML5). • Use simple and advanced CSS3 selectors and properties to style webpages. • Apply the Bootstrap grid framework to create responsive websites. • Utilize the Bootstrap classes to apply styling to responsive websites. • Implement JavaScript functions to add functionality to websites. • Use XMLHttp Request to read content from an external source and integrate this content into a website. • Select HTML elements and apply jQuery animations to the selected elements to make websites interactive.	Having completed this course, students will be able to: • Design and implement platform independent web applications.

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IT-WEB2	Web Development 2	5	After successfully completing the course, the student will have gained knowledge to: - Explain scope and closures in JavaScript - Compare dynamically and statically typed languages - Describe the JavaScript object model - Explain how 'this' works in JavaScript - Outline how prototypes, constructors & the class keyword are used in creating JavaScript objects - Describe how modules work in JavaScript - Compare the use of object-oriented and functional programming paradigms in JavaScript - Explain how concurrency works in JavaScript - Compare unidirectional and bidirectional dataflows - Outline the differences between local and global state management - Compare various rendering patterns including client-side-, server-side- and static rendering - Explain how the canvas element works - Summarize the basics of TypeScript	After successfully completing the course, the student will have acquired the skills to: - Manipulate web pages using JavaScript - Use various JavaScript expressions and operators such as destructuring assignment, spread syntax, rest parameters, short circuit operators and optional chaining - Utilize factory functions to create objects in JavaScript - Make use of concatenative and prototypal inheritance in JavaScript - Apply higher-order functions to abstract over actions - Use callbacks, promises and async/await for asynchronous programming - Organize and clarify code with object-oriented and functional programming techniques - Consume web services using fetch & XMLHttpRequest - Enhance the development process of web applications with built tools like package managers, module bundlers, preprocessors and task runners - Built single page web applications using React - Work with client side routing in a web application - Test the functionality of web applications using unit-, integration- and end-to-end tests - Apply patterns and best practices to measure and improve web performance - Implement a Node web API using Express - Work with authentication using JSON Web Tokens	After successfully completing the course, the student will have acquired competencies in analyzing, designing and constructing web applications using JavaScript and modern front-end frameworks.
ME-AEM1	Advanced Engineering Mathematics	5	After completing this course the student must know: * How differential equations are used in	After completing this course, the student must be able to: * Recognize and solve different types	

Code	Title	ECTS	Knowledge	Skills	Competencies
			the modelling of physical phenomena including: mixing problems; the forced harmonic oscillator; the elastic beam; 1D and 2D wave equations; the heat equation * The key concepts in the theory of ordinary differential equations (ODEs) and their solution including: direc-tional fields; linear, separable, exact ODEs; linear ODEs and systems of linear ODEs w. constant coefficients; phase plane methods, linearization * The key concepts in vector calculus including: gradient, divergence, curl; line, surface and volume integrals; Gauss divergence theorem; Stoke's theorem * The key concepts in the theory of partial differential equations (PDEs) including: principle of superposition; boundary conditions; separation of variables; Fourier solutions * The key concepts in the theory of Fourier analysis including: Fourier series and integrals; expansion of even/odd functions	of ODEs * Apply the most important differential operators * Evaluate multi-dimensional integrals of vector functions also using integral transformation theorems * Calculate Fourier series and integrals * Recognize different types of PDEs and boundary conditions * Solve PDEs using Fourier analysis	
ME-AMD1	Automation, Mechanical Design	5	The students shall gain knowledge in how mechanical and hydrostatic drives are build, work and can be used in machine constructions of mobile equipment. Students will know about: * Design and dimension of Hook's joints. * Equation system and design of planet or epicyclical gears. * Control and regulation of mobile hydraulic systems for open and closed hydraulic circuits. * Complex hydraulic circuits with load	The student will gain skills in - Selecting machine elements and use these for the purpose of automation tasks. - Basic setups to produce complex track structures for mechanical machines. - Analyse of simple PLC program to predict the output.	

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			sensing, priority and combined linear and rotational actuator systems.		
ME-AUC1	Automatic Control	5	After the course, the student has knowledge of • The structure and elements of a control system • Selection of controller (P, PI, PD, PID), and determination of controller parameters • Control strategies (simple feedback, cascade feedback, feed forward) • Analytic (Bode plot, Root locus) and experimental controller (process reaction/ sustained oscillation) tuning • Static and dynamic response • Reference tracking and disturbance rejection • Analysis of closed loop response, using mathematics and using simulation • Logic control • Specification of on-off control, using Grafcet diagrammes • PLC programming	After the course, the student can describe a technical system, select a proper control strategy, and estimate automatic controller parameters, taking reference tracking, disturbance rejection, stability and dynamics into consideration.	
ME-CAD2	Advanced Designing in 3D-CAD	5	The student will acquire knowledge and become confident with the use of the software Autodesk Inventor on a more advanced level. Most of the following topics will be covered: - Sheet Metall - Parts and I - Assemblies (Family members) – based on parametersl - Features and feature reuse - Use of Content Center - Publishing to the Content Center	The student will gain skills to handle and use a 3D CAD system in an engineering professional way and will be able to understand and select relevant tools and technologies	Use and Understand the role of 3D CAD technology in a deeper context regarding the interface and link to Manufacturing, Value Chain Management and Product Data Management.

Code	Title	ECTS	Knowledge	Skills	Competencies
			- Assembly Functions and assembly reuse - Frame Generator - Weldment - design and documentation - Plastic Design - Surface Technology and Advanced Modelling - Dynamic Simulation - Design Accelerator (optional)Rendering and animation (optional)Manufacturing and CAM Programming incl lab exercises (optional)		
ME-DES1	Design of Energy Systems	5	The student will acquire knowledge in, * Refrigeration plants * Heat pumps * Refrigerants * Energy efficiency and impact on the environment * Cooling load * Air conditioning processes	The student will be able to analyse the thermal load for an energy plant and on this basis combine process theory and common dimensioning practice to design an energy efficient cooling plant or heat pump with low environmental impact.	
ME-DIG1	Digitalisation 1	5	The student will acquire knowledge of the following: • The user interface and understanding of the structure in a 3D CAD-system • Use sketching, constraints and dimensions as basis for 3D features • Create geometrical features • Create assemblies • Create and edit 2D drawings for parts and assemblies • Use of CAD in Maker Space • Recognize and identify datatypes • Data acquisition with different sensors • Use of actuators in automatic processes • Basic knowledge about I/O as well as	The student will acquire skills in: • Create 3D parts and assemblies in a 3D CAD-system • Assemble and document parts on a 2D drawing • Use digital twins in connection with 3D printers og CNC machines • Recognise and identify datatypes • Write, test and document simple scripts for controlling a microcontroller • Data acquisition • Use of sensors and actuators	

Code	Title	ECTS	Knowledge	Skills	Competencies
			ADC and DAC		
ME-ENE1	Renewable energy	5	The student will acquire knowledge in, – Energy savings – Thermal solar heating and simulating of energy storage systems using TRNSYS 17 – Other thermal energy system (Packed-bed storage, storage wall and phase change energy storage) – Biomass and biogas – District heating and district heating net-work – Geothermal energy Renewable energy management (e.g. tax structures, costs for energy production, cost analyses, environmental issues)	Analyse the consumption of town or building and evaluate possible energy savings. Calculate the energy produc-tion from renewable sources with the integration of various energy storage scenarios. Calculate the eventually needs for supplementary fossil fuel production and the saving of CO_2 emission.	
ME-ELE1	Electrical Engineering	5	After the course, the student can expound: • Simple DC and AC circuits (complex im-pedance, current and voltage, phasor analysis, load reduction and complex power) • Single and three phase AC systems • Single phased transformers • Three phase systems and the power grid, power in balanced systems • DC motors, types and speed control • AC motors: o Construction, temperature and isolation classes, thermal protection, contactors o Start of motor, load types, start methods, start restrictions, DOL start, Y-D start, soft starters and frequency converters.	After the course, the student has ac-quired skills in: • Analysis of DC and AC systems in-cluded in mechanical system • Loads Analysis	

Code	Title	ECTS	Knowledge	Skills	Competencies
ME-IDP1	Innovation and Design of Products	5	Upon the completion of the course, the student will acquire knowledge: – To define human-centered design. – To describe user experience (UX) design methods. – To identify the fundamental ergonomics aspects in good product design. – To find, characterize and select the most relevant methods/ tools for user needs identification, acquisition and interpretation. – To identify and choose between different design approaches. – To define and formulate customer value proposition. – To classify, interpret and implement business models for product design. To reason system interconnectedness exploration is essential in design thinking	Upon the completion of the course, the student will be able – To extensively apply User Experience (UX) design methods throughout a design project. – To implement correctly the selected methods/tools (e.g. Von Hippel, function analysis, think-aloud, role –play, mood board, etc.) to achieve their designated goals for data analysis/synthesis from the product redesign and human-centered design perspectives. – To relate, evaluate, and reason the key findings derived from the various undertaken analyses and syntheses. – To identify and translate user needs to product design requirements. – To assess solution propositions from business, risk and functionality perspectives (e.g. DeBono, HOQ, 6D's of exponential technology). To implement disruptive thinking to reflect on design solutions and to reframe design problem	Upon completion, the student will be familiar with and be able to implement Design Thinking models to start, plan, innovate, and complete a design project to a conceptual level by taking into account the relevant multiple aspects including system thinking and sustainability, user experience and business innovation
ME-MAT1	Mathematics 1	5	After completing the course, the student can: - Explain limits of simple expressions - Describe the meaning of a functions derivative - Reproduce rules for derivatives, including the chain rule - Explain the meaning of partial derivatives	After completing the course, the student can: - Find limits - Calculate derivatives using standard differentiation rules - Calculate partial derivatives - Determine characteristics of curves, including tangent vector, normal vector and curvature	After completing the course, the student must be able to: Use the covered methods in other courses when appropriate. Read texts that use the notation and concepts covered.

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			- Explain the connection between definite integrals and areas under and between graphs - Identify order and type of ordinary differential equations - Explain the use of polar coordinates - Explain how the complex numbers is an extension of the reals	- Calculate indefinite integrals, using substitution and integration by parts when appropriate - Determine definite integrals - Convert between Cartesian and polar coordinates - Apply complex numbers, including conversion between different representations	
ME-MEC1	Mechanics 1	5	The student acquires knowledge of basic statics within the following: • Description and calculation of force systems, forces, moments, couples and resultants. • Formulation and description of static equilibrium, supports, free body diagram and equilibrium conditions. • The application of join method and section method applied to plane trusses, force calculation in frames and machines. • Definition and calculation of distributed loads, area centroid, external loads on beams, and internal forces in beams. • Identification and formulation of equations for normal force, shear force and bending moment. • Analysis of relationships between load, shear force and bending moment. • Use of cross-sectional constants and material strength values in dimensioning. • Identification and calculation of normal stress, shear stress, Von Misses stress and allowable stress. • Description of dry friction.	The student who completes the course acquires skills in: • Making free body diagrams and formulate static equilibrium equations. • Calculate reactions and determine internal forces in simple structures, which are statically determined. • Dimension and design simple structures and choose materials based on the material's strength values. • Provide calculation documentation in a technical report.	After the course, the student must be able to: • Perform analysis of mechanical loads as a starting point for the design and dimensioning of a simple product. • Be able to take part in projects concerning simple design and dimensioning tasks.
ME-MEC2	Mechanics 2	5	The student acquires knowledge of mechanics in the following:	The student who completes the course acquires skills in: - Defining and determining the stresses and the strains by axial	After the course, the student must be able to:

Code	Title	ECTS	Knowledge	Skills	Competencies
			- Definition and determination of mechanical stresses and strains in materials. - Analysis of planar stresses at combined loads, including the use of Mohr`s Circle. - Use of Static yield and fracture criteria in dimensioning. - Analysis of deformation in structures and calculation of statically indeterminate structures. - Analysis and calculation of columns	load, torsion, bending and shear of a structure. - Analyze planar stresses in structures with a combined load, both when calculating and when using Mohr`s Circle. - Dimension static loaded machine structures including determine the safety to static yield and fracture. - Determine the deformation of beams by integration of the beam differential equation and using superposition based on values from tables. - Calculate reactions in statically indeterminate structures. - Dimension simple centrally loaded columns.	- Analyze, evaluate and document a mechanical design in relation to its strength. - In addition, the student will have the competence to develop his or her knowledge and skills in mechanics.
ME-MEM1	Machine elements and design of machines	5	The student will gain knowledge of machine elements and machine design to be able to: - Explain the theoretical calculation basis for dimensioning of shafts as well as bolted and welded joints. - Explain principles of gears, torque conversion and power loss in mechanical transmissions. - Explain the parameters that form the basis for dimensioning and selection of machine elements such as screws, bearings, shaft / hub connections, couplings, clutches,gears, belts and chains in a machine construction. - Identify and explain the working principles and technical solutions for designing machines.	The student who completes the course acquires skills in: - Analyze loads, simplify and decide calculation models for dimensioning of machines and machine elements. - Calculate, dimension and design shafts, including determining safety against yielding and fatigue. - Calculate, dimension and design simple bolt and weld joints. - Dimension, select and implement suitable standard machine elements such as bearings, bearings, shaft / hub connections, couplings, clutches, gears, belts and chains for a machine construction. - Prepare layout drawing and drawing documentation using geometric tolerances and standard components in CAD. - Use Mathcad or equivalent digital tool for calculation documentation.	After the course, the student must be able to: - Set up possible solutions for the design of machine systems, based on specific requirements / criteria and assess which solutions are best suited. Including choosing solutions that ensure minimal environmental impact. - Find the necessary knowledge in catalogs and technical literature regarding machine elements/components as well as interpret and apply this knowledge in connection with machine design. - In addition, the student will have the competence to develop his or her own knowledge and skills in machine design.

Code	Title	ECTS	Knowledge	Skills	Competencies
ME-MMT1	Materials and Technologies	5	After completing the course, the student will be able to: • Explain metals' mechanical properties • Explain the increase of strength in metals • Explain the relation between deformation, stress and fracture in tension loaded materials • Explain materials' failure • Explain forging • Explain assembly and fastening • Explain machining • Explain fast prototyping • Explain cost price and calculation • Explain greenhouse effect • Explain circular economy and the sustainable circles • Explain and make a simple life cycle analysis • Explain United Nations Sustainable Goals • Use Edupack program	After completing the course, the student will gain skills in: • Select an appropriate type of steel for manufacturing of components. • Select an appropriate strength increasing method. • Perform common tests for materials. • Select suitable technological processes based on production volume, geometry, surface requirements, tolerance requirements, load situation, etc. in relation to environmental impact and the sustainable principles. • Explain the function of different types of production equipment. • Estimate the cost price of products. • Perform a simple life cycle analysis of a product. • Use Edupack program for selection of materials and technologies	
ME-PWS1	Workshop: Turning and Milling	0			
ME-PWS2	Workshop: Welding, cutting and bending	0			
ME-SPP1	Sustainable Power Production	5	The student will acquire knowledge in 1. Photovoltaic cells and batteries 2. Fuel cell and hydrogen storage 3. Smart grid 4. Wind energy 4.1 Wind resources 4.2 Rotor blades for a wind turbine 4.3 Terrain classification, Roughness and orography 4.4 Wind turbine generator 4.5 Wind farm 4.6 Wind turbine transformer and electrical	Use the WAsP computer program to estimate annual power production for a wind turbine or a group of wind turbines (Wind farm) and Q blade software for wind turbine blades design. Calculate the power output of photovoltaic cells installation with energy storage. Be able to select between different energy storage scenarios.	

Code	Title	ECTS	Knowledge	Skills	Competencies
			grid 4.7 Cooling system in wind turbine 4.8 Wind turbine components materials		
ME-TDE1	Technical Design	5	The student will acquire knowledge of the following: - Sketching of isometric views and doing simple developments - Using 3d CAD in technical drawing - Illustrating using the first quadrant method (European) - Dimensioning after known standards (DS/ISO 128, 129) - Using tolerances in relation to assemblies - Combine surface roughness with production methods - Weldment sections in relation to weld symbols - The use of geometrical tolerancing when design machine components - Structured drawing documentation (layout, assemblies, detail drawings and parts lists)	The student will acquire skills in: - Presenting technical documentation in 2D and 3D - Creating machine drawings according to DS/ISO 128/129 and using general tolerancing and fit tolerances - Define an describe machine components making sketches, drawings, assembly drawings and parts lists. - Identify and using standard parts in machine design	After completing the course, the student will be able to: - Present and sketch technical ideas - Construct a product from described criteria's - Argue technical solutions in a dialog with suppliers - Produce technical documentation for production - Understand production preparation of raw materials and have a dialog about production methods
ME-TER1	Thermodynamics	5	Describe, construct and interpret a thermodynamic system. Apply and understand the main laws and fundamental concepts of thermodynamics. Calculate and depict processes for ideal gas and water vapour. Apply elementary flow theory for calculations and dimension of pipe systems and pumps. Calculate and dimension heat exchangers/heat transmission. Calculate main data for plants that use water vapour for production of power and heat.	Analyse a thermodynamic system and select relevant theory in order to enable the student to calculate variables and main capacities for the system. Use the thermodynamic calculation as basis of calculation of geometric dimensions for the system or selection of components. Use EES software for thermodynamic calculations	
SE-LCA1	Circular Economy and LCA	5	Students completing this course will be familiar with:	Students completing this course will be able to:	

Code	Title	ECTS	Knowledge	Skills	Competencies
			- The international guidelines for LCA analyses (ISO standards 14040 and 14044). - The step-by-step working process that must be followed when carrying out an LCA analysis. - The rinciples behind defining functional units, system boundaries and time scopes for LCA analyses. - Chosen data sources providing data for LCI´s and LCIA´s. - Different environmental impact categories. - The common way to graphically present end results of LCA analyses. - How the UN system influences global development within CE. The UN SGDs	- Define functional units, system boundaries and time scopes for LCA analyses according to the guidelines. - Carry out LCA analyses for simple production or service system scenarios according to the guidelines. - Compare competing production or service systems based on an LCA analysis. - Present and interpret results of LCA analyses and discuss these in relation to decision-making. - Search for and identify relevant data for Life Cycle Inventories (LCI).Prepare simple Life Cycle Inventories (LCI) and carry out Life Cycle Impact Assessments (LCIA) based on these, according to the guidelines. - Graphically present the results of LCA analyses and explain how these are related to the former steps of the analyses. - Carry out an LCA by using the program "LCABYG" - .Identify barriers to change of CE development. - Identify opportunities for CE business development. - Make a simpel business model. - Formulate individual change of behavior to promote CE. - Evaluate business cases in relation to fulfilling the SDG. Promote circular economy as an innovation tool for companies.	

14 Appendix 3: Courses in the Global Business Engineering Prgramme – enrollment 2019 & 2020

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
GBE-BPR1	Bachelor Project (GBE/GBT)	20	The students must demonstrate detailed knowledge of the core elements of all the subjects, theories, models and methods, which have been part of the Global Business Engineering syllabus.	The students must demonstrate their ability to choose and apply relevant theories models and methods from the total Global Business Engineering syllabus to solve a real life problem.	The students must demonstrate their ability analyze a real life problem, use relevant theories, models and methods for creating a solution and present the solution, findings and conclusions in a well written project report.	Prerequisites for exam: All other exams and semester projects must be passed. Exam type: Oral exam based on project report handed in before deadline. Group presentation (15 minutes per project + 5 minutes per student if more than one student in the group) The total time for the oral exam including group presentation, examination, evaluation and feedback will be: • Groups of one student: 60 minutes • Groups of two students: 90 minutes • Groups of three or more students: 120 minutes The basics for the examination are the Project report (Including Product Description, Process Report and appendices included) and the presentation of the project. External censor Tools allowed: All Re-exam: Standard procedure for re-examination is to write a new project. Timing of re-examination follows the ordinary examination periods at GBE in January and June. There are 3 attempts to pass the bachelor project. Failure to hand in a bachelor report on time results in one missed attempt. Example: report is not handed in for the January exam. Handing in the report for the exam in June will constitute attempt no 2 and so on. 3rd and last attempt will be in January the following year. All in all, the bachelor project must be completed within one year (January-June-January). Exception to

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
						these rules will only be granted in the most exceptional of circumstances, e.g. serious illness, and must be approved by the GBE head of Department.
GBE-BUE1	Business Economics	5	The students should be able to: - Identify and sketch the firm's demand and supply functions - Identify and sketch the optimal price and quantity that maximizes the firms profit - Identify and sketch the different market structures - Identify and sketch the aggregate demand and Supply for the market / industry - Identify the Macroeconomic tools and objectives - Identify and describe the different macroeconomic policies	At the end of this course, and having completed the essential reading and activities, the students should be able to: - use appropriate tools to model company price and output decisions under different market structures - analyze and assess efficiency and welfare optimality of perfectly and imperfectly competitive markets - analyze and asses the effects of externalities and public goods on efficiency - analyze and assess government policies aimed at improving welfare.	After the course, the students should be able to: - use the most important theories from "Microeconomics" to analyse the business microeconomic environment - understand cost structures of firms and be able to find the optimal price and quantity that will maximize a firm´s profit under different assumptions of market structures - use the most important theories from "Macroeconomics" to obtain knowledge on the global macro economy - analyse and assess the connection between various macroeconomic changes and the significance of the change to the concrete company.	Written examination (TEST) Two tests each of 2 hours duration Allowed tools: Course literature according to the course description Personal notes Laptop Calculator The exam grade will be given from the two tests held during the course which each account for 50% of the final grade. Re-exam (for both tests) will take place during the re-examination period in February.
GBE-DAN1	Danish Culture and Society 1	5	The students should have knowledge about/understand and reflect on: The Danish language, including basic grammar, sentence structure, vocabulary and pronunciation.	After the course the students should be able to: • Read and understand the contents of texts, which in a relatively simple language describes everyday life in Denmark • To scan texts for specific information. • Write easy texts. Acquire knowledge about Danish culture and society.	After the course the students should to a certain extent, be able to: • Communicate in Danish in an understandable language, orally and in writing. • Function and cooperate with people with different educational, language, and cultural backgrounds Understand and discuss every day conditions in a comparatively simple language.	Oral Examination Individual oral examination based upon a subject found by draw. No preparation Allowed tools: None External examiner Additional information: The students are examined based on "På vej til dansk" from which the students must read aloud, answer questions, participate in a discussion and deal with verbs and nouns. Two out of tree compulsory tests during the course, will count 30 % toward the final mark. In

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
						the event of a borderline mark, participation during the course influences the outcome. The course must be passed before the limit set in the course curriculum.
GBE-DAN2	Danish Culture and Society 2	5	The students should have knowledge about/understand and reflect on: The Danish language including basic grammar, sentence structure, vocabulary and pronunciation.	After the course the students should be able to: • Read and understand the contents of texts, which in a relatively simple language describes everyday life in Denmark • To scan texts for specific information. • Write easy texts. • Acquire knowledge about Danish culture and society.	After the course the students should to a certain extent, be able to: • Communicate in Danish in an understandable language, orally and in writing. • Function and cooperate with people with different educational, language, and cultural backgrounds • Understand and discuss every day conditions in a comparatively simple language.	Oral Examination Individual oral examination based upon a subject found by draw. No preparation Allowed tools: None External examiner. The oral examination is weighted 70 %. In addition, 3 compulsory tests are conducted during the course. 2 of these will count 30 % toward the final mark. In the event of a borderline mark, participation during the course influences the outcome. Please note that re-examinations may take a different form than the ordinary exams.
GBE-DAN3	Danish Culture and Society 3	5	The students should have knowledge about/understand and reflect on: Extracting the essence of a job announcement and formulating CV and job application. Fundamental grammar, communication skills, comprehension.	After the course, the students should be able to: • Extracting the essence of a job announcement • Formulating a CV and job application • Making a job interview in Danish • Acquire knowledge about Danish culture and society.	After the course the students should to a certain extent, be able to: • Communicate in Danish in an understandable language, orally and in writing. • Function and cooperate with people with different educational, language, and cultural background • Understand and discuss every day conditions in a comparatively simple language.	Oral Examination Individual oral examination based upon an application Individual oral examination based upon a subject found by draw No preparation External examiner. The oral examination is weighted 70 %. In addition, 3 compulsory tests are conducted during the course. In the event of a borderline mark, participation during the course influences the outcome.

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
						Please note that re-examinations may take a different form than the ordinary exams.
GBE-DMA1	Digital Marketing	5	The students will be introduced to core theories, models and tools in the field of digital marketing that will result in knowledge of: - The role of digital marketing as a part of business world and company's overall marketing strategy using the SOSTAC model - Integrated digital marketing by using the RACE framework - Translating SMART goals into digital strategy formulation - To validate the relevance and the usefulness of tools in connection with decisions concerning DM strategic choices. - Based on a digital marketing strategy analyse, map and design the customer experience - Developing customer personas - Online customer journeys with digital touchpoints - Understand social media's potential for relationship-building and online community creation.	At the end of this course, and having completed the essential reading and activities, the students should be able to Participate in the planning and execution of a company's digital marketing Identify key factors relevant for the planning process Define DM KPIs corresponding with business objectives Choose and integrate relevant digital channels into a company's overall marketing strategy, depending on context and objectives Describe social profiles/personas Create customer journey maps with relevant digital touch points	After a successful completion of the course the student will have the competencies to: Develop strategies for obtaining competitive advantages through digital marketing Measure and evaluate on a company's digital marketing strategy Design DM strategies according to a company's objectives and available resources. Utilize social media's potential for relationship-building and online community creation Analyse and identify best ways to attract customers via SEO efforts Develop strategies for marketing automation	Prerequisites for exam: Mandatory assignment handed in before deadline and in line with the project description and requirements including alignment with the VIA Guidelines for Writing Projects. The written project accounts for 30% of the total grade. Exam type: Individual oral examination. The exam will include student's presentation of key aspects of the group project. It should include reference to: The corresponding course models and theories The key findings and recommendations Additional reflections / personal comments outside of the written report A Q&A will follow Oral Exam accounts for 70% of the total grade (Total time 20 min: 5 min presentation, 10 min Q&A, 5 min evaluation). Internal censor Tools allowed: Personal notes, Final Project, (no class slides) Re-exam:

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
			- Lead generation and qualifying of prospects with inbound marketing methods - SEO and SEM (paid search marketing) - Marketing automation - To identify the control methods for DM programs that correspond with business objectives.			Please note that re-examinations may take a different form than the ordinary exams.
GBE-ENB-M2	Engineering Basics for Mechanical Engineering 2	5	The student should acquire knowledge about: Within the topic of DC electricity: Electric charge, electric potential, current and resistance, Ohm's law, electric power, circuit analysis, solar panels. Within the topic of thermodynamics: Temperature and heat, phase changes and heat transfer, the ideal gas equation	After completing this course the student must be able to: Solve simple exercises in electrostatics Solve simple exercises related to DC circuits Solve simple exercises in thermodynamics	After completing this course, the student must be able to apply the acquired knowledge and skills in simple real-world problems, in order to follow more advanced courses within electricity and thermodynamics, and to independently acquire further knowledge.	4 hours written final examination, external co-assessor. All usual tools allowed.
GBE-ENT1	Entrepreneurship	5	The student will obtain a profound understanding of how to use reflection in areas as innovation, entrepreneurship, establishing and qualifying a business identity, understanding complexity in business, leadership and projects generating value on entrepreneurial premises.	The student will be able to establish, identify and differentiate a business idea on practical as well as immaterial perspectives, have integrated the entrepreneurial way of working on personal-, team- and organizational level and be able to use many sources and perspectives for creating value in projects, idea generation etc.	The student will have acquired competencies to generate business ideas, qualify business ideas, reflect on operationalize business ideas. First, obtaining a fundamental knowledge of how entrepreneurship differs from more traditional ways of thinking about business and how to handle complexity in relation to business creation or change and personal characteristics related to the student and business partners.	Prerequisites for exam: None Exam type: Oral group examination consisting of a group presentation based on students portfolios, followed by a discussion between students and examinators. The portfolios will consist of both group and individual assignment and needs to be handed in before a deadline set by the lecturer. Duration of exam will be 60 minutes to groups of 3 or 4 persons or 75 minutes to groups of 5 or 6 persons.

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
						Internal censor is used. Individual grade is based on overall assessment of written group report, presentation and discussion and individual report. Tools allowed: All Re-exam:As ordinary.
GBE-GBC1	Global Business Communication 1	5	After the course the students should be able to: - understand the international business environment - describe communication models - explain the writing process - identify approaches to writing routine, positive and negative messages in English - describe presentation techniques in English - Account for different aspects of professional writing - Account for different aspects of the semester theme.	After the course the students should be able to: - analyse a communication situation as to target group, message, choice of communication channel etc. - communicate precisely and with a varied vocabulary in English, orally as well as in writing - develop material to be used in a company's internal as well as external communication using correct terminology, syntax and stylistics - discuss linguistically complex texts in English - apply relevant terminology within business and technical subjects - apply relevant communication models - present the results of self-studied subjects in English professionally - write a project report in a professional style used in business communication and according to the guidelines for writing reports - present the results of the project work orally in a clear and concise language.	In their project work, during their internships, and in their future jobs as global business engineers, the students should be able to: - Apply selected relevant approaches when writing professional business messages - Communicate effectively and professionally with a company's internal and external stakeholders, using correct terminology and syntactically correct structures in speech and writing - Interact and cooperate with people from different cultural backgrounds - Critically acquire new knowledge within relevant job-related areas.	Written examination. Duration: 4 Hours. Allowed tools: All. External examiner. Please note that re-examinations may take a different form than the ordinary exams.
GBE-GBC2	Global Business Communication 2	5	After the course the students should be able to: identify approaches to writing persuasive messages in English	After the course the students should be able to: analyse a communication situation as to target group, message, choice of communication channel etc.	In their project work, during their internships, and in their future jobs as global business engineers, the students should be able to:	Written examination. Duration: 4 Hours

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
			identify requirements to project writing in English account for the conventions of technical writing in English describe different aspects of the semester theme account for different academic writing requirements in terms of syntax, coherence and structure.	communicate precisely and with a varied vocabulary in English, orally as well as in writing apply different academic writing requirements in terms of syntax, coherence and structure discuss linguistically complex texts in English apply relevant terminology within business and technical subjects apply the conventions of technical writing in English present the results of self-studied subjects in English professionally write a project report in accordance with the guidelines present aspects of the semester theme orally in a clear and concise language.	apply selected relevant approaches when writing professional business messages communicate effectively and professionally with a company's internal and external stakeholders, using correct terminology and syntactically correct structures in speech and writinginteract and cooperate with people from different cultural backgrounds critically acquire new knowledge within relevant job-related areas.	Allowed tools: All External examiner Please note that Internet access is not allowed apart from Wise flow. Please note that re-examinations may take a different form than the ordinary exams.
GBE-ENB ICT1	Engineering Basics for Information and Communication Technology	5	The student will be able to: - Describe the basics of computer software program logic and flow - Identify the basic components of computer hardware architecture - Describe the components and properties of embedded systems - Describe and test the functionality of a robot - List common data types and describe the concept of type conversion - Identify binary numbers up to the decimal number 15Define the term "algorithm" - List at least three types of sensors used for working with robots - Identify the basic activity diagram notations and symbols	The student will be able to: - Perform basic programming through a visual programming language - Design and describe an IT system, including using UML activity diagrams - Solve simple physical challenges by constructing and designing robots from bricks, motors and sensors - Control the motors and sensors of a robot through software - Explain the purpose of multithreading when writing software - Work with basic data structures, including arrays - Apply the basic operations of boolean algebra - Create simple mobile applications in order to remotely control a robot	The student will be able to: - Design, construct and program robots for specific activities and scenarios - Design and implement an IT system - Solve problems through an analytical, engineering approach - Predict the interaction between an autonomous system and its environment	Oral Examination The examination is a joint exam with GBE-SEP1 Group presentation followed by individual examination Group presentation of the GBE-SEP1 project – 15 minutes Individual examination – 20 minutes10 minutes of examination in the GBE-SEP1 project10 minutes of examination in a drawn GBE-ENB ICT1 question, based on course work Both courses are graded individually Allowed tools: All Internal examiner Please note that re-examination may

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
			- Describe imperative pro-gramming concepts, includ-ing assignments, loops, vari-ables, conditions and ex-pressions			take a different form than the ordinary exam
GBE-ENB M1	Engineering Basics for Mechanical Engineering	5	The students should acquire knowledge about: - The SI unit system - Kinematics: velocity and ac-celeration in 1D and 2D, pro-jectile motion - Dynamics: Newton's Laws, work, kinetic and potential energy.	After completing this course, the stu-dent will be able to: - Correctly use the SI-unit system and perform dimensional checks of calculations - Analyze and solve simple prob-lems within kinematics and dynam-ics.	The students should gain competences in: - Reading scientific text including formulae, graphs, diagrams etc. - Applying an analytical and system-atic approach to simple, stylized engineering problems - Communicating simple calcula-tions using concise language, for-mulae, and sketches.	Written examination. Duration: 4 Hours Internal examiner In order to attend the exam, the practi-cal course assignment must be com-pleted and presented before the dead-line set by the teacher. If the student fails to complete the assignment, one exam attempt has been used and a new deadline for the completion will be set. All usual tools (including laptops) are al-lowed, but the student is strictly forbidden to access the internet during the exam. Pen-and-paper solutions must be scanned after exam – scanners are provided. Please note that re-examinations may take a different form than the ordinary exams.
GBE-FCM1	Financial Manage-ment	5	Upon completion of this course, the student will be able to: • Read and understand com-pany financial reports • Explain how companies make decisions on invest-ments and carry out risk as-sessments in connection with investment decisions	Upon completion of this course, the stu-dent will be able to: • Analyze and interpret company fi-nancial reports in a communication context. • Select and apply methods for mak-ing calculations and assessments of companies' investment pro-posals • Select and apply methods for ana-lyzing the risk profile of companies' investment proposals	Upon completion of this course, the stu-dent will be able to: • Carry out and present calculations of the return on an investment, perform sensitivity analysis and set up relevant scenarios and proba-bility analysis. • Act as a constructive sparring part-ner for executives' who are re-sponsible for decisions about stra-tegic investments in and financing	Prerequisites for exam: None Exam type: Written examination - Duration: 3 hours All students will be evaluated on their ability of applying the taught methods to a practical case exercise. It will be looked at, if the students are able to an-alyse the presented data in relation to the actual situation and evaluate on risk factors.

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
			• Identify methods for making calculations and assessments of investment proposals • Identify different options for raising capital for company investments • Explain methods for optimizing companies' use of working capital	• Use methods to measure company financial performance • Apply methods that can optimize companies' use of working capital	of capital equipment and or product/market development • Evaluate and present the financial consequences of an investment proposal.	External censor Examinations account for 100 % of final grade. Tools allowed: Course literature according to the course description Personal notes laptop Calculator Re-exam: Please note that re-examinations may take a different form than the ordinary exams
GBE-FRE1	French Culture and Society	5	After the course the students should have knowledge about, understand, and reflect on: - The French language, including syntax, phonetics, grammar, and semantics. - Historical, social, cultural, and political conditions in French-speaking areas.	After the course the students should be able to: - communicate in French by using rather simple sentence structures, primarily in oral French and secondarily in written French. - understand spoken French. - read, understand and discuss authentic texts in French about cultural, social or political issues. - make presentations on cultural, social or political issues. - write simple texts in French. - search information in French on cultural, social and political issues and present the results of this in French.	After the course the students should be able to - communicate in a rather simple French. - function and cooperate with people with different educational, language, and cultural backgrounds. - structure own learning and critically acquire new knowledge within relevant engineering areas. - use the knowledge of the French language and the French society as well as the French-speaking areas in practice in an international context.	Oral examination Individual oral examination based upon a subject found by draw. Preparation time 40 minutes. Allowed tools: All NB Internet access not allowed except studynet and online dictionaries External examiner The course must be passed before the limit set in the course curriculum.
GBE-FRE2	French Business Language I	5	The students should have knowledge about/understand and reflect on: - the French language including basic grammar - sentence structure, vocabulary and pronunciation	After the course, the students should be able to: - use relevant business terminology - read and understand authentic texts in French on issues relating to business and industry	After the course, the students should be able to: - communicate in French in a clear language, orally and in writing, in international contexts.	Oral examination Individual oral examination based upon a subject found by draw. Preparation time 40 minutes. External examiner

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
			- business and industry in France Topics relating to business and industry in other French-speaking countries can also be included.	- find, use, and discuss information in French on business subjects - make presentations in French on various subjects - prepare simple texts in French with special focus on the global business engineer's professional area	- function and cooperate with people with different educational, language, and cultural backgrounds. - structure own learning in an effective way and critically acquire new knowledge within relevant engineering areas. - put the knowledge of the language and the French society and the French-speaking countries into practice in an international context.	Allowed tools: All Please note that re-examinations may take a different form than the ordinary exams.
GBE-FRE3	French Business Language II	5	The students should have knowledge about/understand and reflect on: - The French language, including syntax, phonetics, grammar, and semantics. - French industry and business life. - Intercultural affairs and business protocol in France and/or French-speaking countries. - How to make presentations.	After the course, the students should be able to: - Read, understand and discuss texts in French on social, business and engineering issues. - Be confident in using appropriate terminology within subject areas discussed in class. - Negotiate with French-speaking cooperation partners. - Make presentations in French. - Express themselves orally in French with a rather high level of accuracy.	After the course, the students should, to a high extent, be able to: - - Communicate in a clear language, orally and in writing, in international contexts. - Function and cooperate with people with different educational, language, and cultural back-grounds. - Structure own learning in an effective way and critically acquire new knowledge within relevant engineering areas. - Put the knowledge of the language and the French society and the French-speaking countries into practice in an international context.	The student is examined on the basis of: 1) A presentation and discussion of a previously unknown text handed out prior to the preparation, and one or more questions to the course curriculum. OR a negotiation case where the student plays one part and the lecturer the other part, and one or more questions to the course curriculum. 2) A presentation of the semester project SEP5 (10 min. power point presentation). All aids are allowed during preparation. Please note that re-examinations may take a different form than the ordinary exams.
GBE-GER1	German Culture and Society	5	After the course the students should have knowledge about, understand and reflect on - the German language, including syntax, phonetics, grammar, and semantics - historical, social, cultural, and political conditions in	After the course the students should be able to: - communicate reasonably well in German - understand spoken German - read, understand and discuss authentic texts in German about cultural, social or political issues	After the course the students should to a certain extent, be able to - communicate in a clear language, orally and in writing, in an international context - function and cooperate with people with different educational, language, and cultural backgrounds	Oral examination Individual oral examination. The examination is composed of an unknown text and questions in relation to the topics of the course. Preparation time 40 minutes. Duration of examination: Approx. 20

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
			German-speaking areas.	- make presentations on cultural, social or political issues - write simple texts in German - search information in German on cultural, social and political issues and to present the results of this in German.	- structure own learning in an effective way and critically acquire new knowledge within relevant engineering areas - use the knowledge of the German language and the German society as well as the German-speaking areas in practice in an international context.	minutes. Allowed tools: All External examiner. Please note that re-examinations may take a different form than the ordinary exams. The course must be passed before the limit set in the course curriculum.
GBE-GER2	German Business Language I	5	The students should have knowledge about/understand and reflect on: - the German language including basic grammar - sentence structure, vocabulary and pronunciation - business and industry in Germany Topics relating to business and industry in other German-speaking countries can also be included.	After the course, the students should be able to: - use relevant business terminology - read and understand authentic texts in German on issues relating to business and industry - find, use, and discuss information in German on business subjects - make presentations in German on various subjects - prepare simple texts in German with special focus on the global business engineer's professional area.	After the course, the students should be able to: - communicate in German in a clear language, orally and in writing, in international contexts - function and cooperate with people with different educational, language, and cultural backgrounds - structure own learning in an effective way and critically acquire new knowledge within relevant engineering areas - put the knowledge of the language and the German society and the German-speaking countries into practice in an international context.	Admission to the examination is on condition that 1) a number of written assignments - stipulated by the teacher at semester start - has been handed in on time and approved and that 2) one oral presentation has been made and approved within the stipulated deadline. Oral examination Individual oral examination based upon a subject found by draw No preparation Preparation time 40 minutes, examination 20 minutes. Allowed tools: All External examiner. Please note that re-examinations may take a different form than the ordinary exams.
GBE-GER3	German Business Language II	5	Have knowledge about/understand and reflect on: - The German language, including syntax, phonetics, grammar, and semantics.	After the course, the students should be able to: - Read, understand and discuss texts in German on social, business and engineering issues.	After the course, the students should, to a high extent, be able to: - Communicate in a clear language, orally and in writing, in international contexts.	Admission to the examination is on condition that 3 compulsory written assignments will be handed in and approved within the stipulated deadlines. The student is examined on the basis of:

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
			- Have knowledge about German industry and business life. - Have knowledge about intercultural affairs and business protocol in Germany and/or German-speaking countries. - Have knowledge about how to make presentations.	- Be confident in using appropriate terminology within subject areas discussed in class. - Negotiate with German-speaking cooperation partners. - Make presentations in German. - Express themselves orally in German with a rather high level of accuracy.	- Function and cooperate with people with different educational, language, and cultural backgrounds. - Structure own learning in an effective way and critically acquire new knowledge within relevant engineering areas. - Put the knowledge of the language and the German society and the German-speaking countries into practice in an international context.	1) A presentation and discussion of a previously unknown text, handed out prior to the preparation, and one or more questions to the course curriculum. OR a negotiation case where the student plays one part and the teacher the other part, and one or more questions to the course curriculum. 2) A presentation of the semester project SEP5 (10 min. power point presentation). All aids are allowed. Please note that re-examinations may take a different form than the ordinary exams.
GBE-INO1	Engineering Innovation Weeks (GBE/XA)	5	After having successfully completed the course, the students will have gained: - An understanding of innovation and its uses within the field of engineering - Knowledge about Design Thinking (double diamond) process Knowledge about how to create a systematic and measurable progress in innovation tasks	After having successfully completed the course, the students will be able to: - Engage in innovative processes in a cross-/inter-/multidisciplinary setting - Conceive, plan, and execute innovative ideas - Work methodically with innovation Collect and apply relevant information about technologies, markets and end users	After having successfully completed the course, the students will have gained competences in: Introducing innovative ideas into project work Contributing own professional skills in teams with the objective of solving problems by using innovative processes and models Clarifying multidisciplinary group competencies	Prerequisites: Mandatory assignments handed in before deadline and accepted. Attendance 80% Type of examination: Individually writtten multiple choice test, with a duration of 30 minutes, performed without aids. Internal examiner. (15/25 correct answers is required to pass the test). Allowed tools: No tools allowed (besides laptop for test) Re-exams:
GBE-INP1	Engineering Internship (GBE-)	30	The student must:	The student must: • be able to apply the methodologies	The student must:	In order to get an internship evaluated, the student must fulfill the following re-

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
			• gain knowledge of theory, methodology and practice within a profession or one or more fields of study • be able to understand and reflect on theories, methodology and practice • be aware of non-technical – societal, health and safety, environmental, economic and industrial – implications of engineering practice.	and tools of one or more fields of study and to apply skills related to work within the field/fields of study or profession • be able to assess theoretical and practical problems and to substantiate and select relevant solutions • be able to communicate professional issues.	• be able to handle complex and development oriented situations in study or work contexts • be able to independently participate in professional and interdisciplinary collaboration with a professional approach • be able to identify own learning needs and to organise own learning in different learning environments • promote an engineering-oriented approach during the remaining semesters on the Bachelor pro-gramme • develop personal skills required for the professional career as engineer • form the basis for developing personal/professional network	quirements concerning mandatory assignments: • Expected outcome/specific learnings targets for the internship position • Company presentation • Logbook • Main academic assignment(s) • Final reflections • Participation in workshop for coming interns
GBE-MAM1	Marketing Management	5		• Choose relevant marketing theories and models in a given context • Identify, evaluate and choose marketing strategies • Perform a simple macro analysis • Perform competition and competitor analysis • Perform customer analysis regarding need, wants and buying behaviour in the B2C and B2B market • Choose target groups on the basis of segmentation • Design a marketing mix in line with situation analysis, target group and chosen strategies.	• Use basic theories and models within marketing management and obtain a good level of knowledge in regards to their use and limitations • Make a well structured situational analysis of a company and its marketing environment • Be able to identify relevant marketing issues and on the basis of these to design well-founded and cohesive marketing strategies and action plans.	50% of the overall grade is given through 2-3 tests in the period where the course is conducted. 4 hours of written examination after the course finish accounts for the remaining 50%. All aids (textbooks, notes, articles, assignments etc. are allowed for the examination). Cases, themes, articles etc. to be used at the examination can be published prior to the examination. Marks are given according to the Danish 7-step-scale.
GBE-MAM2	Global Marketing	5	After taking this course the student should possess the following qualifications: • The difference between global, glocal and local international marketing strategies • A broad knowledge of the global market place	• Build a market profile of a country by conducting a PEST and market analysis • Critically evaluate a company's international marketing environment and its current strategy • Access the opportunities and risks associated with initiating an international market strategy or expand an already international presence	• Be able to identify global opportunities, in particular in developing and emerging markets, and assess the associated risks • Conduct a detailed country analysis including both macro and micro market factors using desk research • Be able to quickly and effectively research market opportunities and	4 hours written exam

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
			• Identify the steps in the international marketing process and the complexities of the international marketing environment • Gain an understanding of the current state of global marketing, the forces driving globalization and the resulting challenges for both existing international companies and for domestic companies planning to start an internationalization process • Key trends in major regional trading blocs around the globe • Appreciate and understand the specific problems associated with international marketing and the internationalization process • Have a clear understanding of all aspects of international marketing strategy development and the international marketing planning process • Understand the differences in social/cultural conventions that affect buyer behaviour and marketing approaches in international markets • Internationalization strategies for small and large companies • Effective search, screening and selection of new countries to enter • The complete range of market entry methods and their advantages and disadvantages • International marketing mix strategies • The parts included in a marketing research brief	to new countries for both small and large companies • Provide input to international market strategy development • Be able to decide which markets to enter and evaluate the pros and cons of different entry modes • Design an international marketing mix including the ability to determine which parts of the marketing mix will require adaptation and to which degree	to apply relevant country selection screening and segmentation criteria • Develop a global marketing strategy and write an international marketing plan that is aligned with the objectives and competencies of the company • Analyze and determine the most appropriate method of market entry • Spot important international trends on a continuous basis	

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
GBE-MAT1	Mathematics 1	5	After the course the students should be able to solve simple mathematical problems within the areas of: 1. 2D vectors 2. 3D vectors 3. Vector valued functions in 2D	After the course the students should be able to: analyse simple problems within 2D and 3D vectors, vector valued functions in 2Dapply relevant terminology within basic mathematical subjects.	In their project work, during business and engineering courses which are part of the global business engineering programme, and in their future jobs as global business engineers, the students should be able to: Apply mathematical knowledge in solving specific problems	Written examination Duration: 4 Hours Allowed tools: Course literature according to the course description Personal notes Laptop (no web access)Calculator. Internal examiner Please note that re-examinations may take a different form than the ordinary exams. The course must be passed according to time limits in the curriculum.
GBE-MAT2	Mathematics 2	5	After the course the students should be able to solve simple mathematical problems within the areas of: 1. Optimisation 2. Integration 3. Differential equations 4. Trigonometric equations	After completing this course the student must be able to: - Understand and solve simple problems including trigonometric functions. - Solve problems, which include integration of functions with one unknown factor. - Solve problems, which include the function and its derivative.	In their project work, during business and engineering courses which are part of the global business engineering programme, and in their future jobs as global business engineers, the students should be able to: Apply mathematical knowledge in solving specific problems	Written examination Duration: 4 hours Allowed tools: Course literature according to the course description Personal notes Laptop (no web access) Calculator External Examiner Please note that re-examinations may take a different form than the ordinary exams.
GBE-MAT3	Mathematics 3	5	The student will obtain knowledge within polar coordinates and linear algebra including solution of systems of linear equations, inverse matrices and eigenvalues.	After completing this course, the student will be able to: - Use polar coordinates for describing points and curves - Determine lengths and areas bounded by curves given in polar coordinates	After completing this course, the student can: - Recognize and solve simple problems where polar coordinates are useful - Recognize systems of linear equations, reformulate them in the language of linear algebra, and solve	Written examination Duration: 4 hours Allowed Tools: * Course literature according to the course description * Personal notes

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
				- Apply techniques and results from linear algebra to solve problems in linear systems of linear equations - Determine inverse matrices and find eigenvalues of matrices - Use CAS software for linear algebra	them, if necessary using CAS software - Read texts where polar coordinates or basic linear algebra is used	* Laptop (no web access) * Calculator External examiner. The course must be passed according to time limites in the curriculum. Please note that re-examinations may take a different form than the ordinary exams.
GBE-MST1	Strategy, Organization and Management	5	After the course, the students should be able to: • Describe organizational behavior and structures • Define the concept of management and leadership including the different styles of management and leadership • Identify the basic issues of business strategy • Describe the elements of the strategic planning process and a range of strategic tools.	After the course the students should be able to: • Evaluate, design, and choose appropriate organizational structures • Evaluate and choose relevant management and leadership strategies • Apply methods for organizational change processes • Analyze the external macro and micro environment in the context of business strategy making • Analyze the internal environment in the context of business strategy making • Summarize strategic options • Explain how to design, evaluate, choose and implement appropriate business strategies	After the course the students should be able to: • Compare and discuss the basic issues of management and leadership • Evaluate and apply the appropriate kind of management/leadership in a given situational context • Compare and discuss the basic issues of business strategy • Apply different strategic tools • Apply methods for implementation of a strategic planning process in an organizational context	<u>Prerequisites for exam:</u> Hand in of a written report on the case work before deadline. <u>Exam type:</u> 4 hour written exam with external censor. <u>Tools allowed:</u> All, except internet <u>Re-exam:</u> As ordinary and at the next ordinary exam
GBE-PRM1	Project Management	5	The students will be able to: • Apply the planning process method to a complex project • Describe and explain what it takes to manage and run a complex project	The students will be able to use the methodology and tools for… • Estimating Project Time and Costs • Planning a Project • Using Risk Management • Conducting Team Management • Completing a project	During the course the students will work with analysis of a real time project and by applying acquired theoretical knowledge being able to outline used methods and tools including: • Project Description / Scope • Project plan • Project organization	Prerequisites for exam: Hand in and acceptance of all mandatory group assignments. Exam type: Written examination consisting of two reports. A group report on the case work handed in before end of semester

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
					• Risk Analysis • Communication plan based on stakeholder analysis All leading to successfully managing and controlling a project. .	(end of lectures). An individual reflection report submitted one week after the group report. External censor is used. Grade is based on overall assessment of written group report and individual report. Tools allowed: All Re-exam: As ordinary
GBE-SEP1	Semester Project 1: Robotics	5	The student should be able to understand: - The use of robots - How to describe functionality of a robot - The nature of autonomous systems - How to test the functionality of a robot - Group roles and group dynamics. - How to develop and prepare a marketing plan	The student should achieve the skills to: - Build a robot - Develop software to control a robot - Describe functionality using a dynamic model - Test the functionality of a robot - Present considerable skills for presentation, both written and oral - Present a project report in a well-structured manner - Describe a project in a process report - Solve a specific task in collaboration with group members - Analyze a market by collecting relevant data relating to macro trends (PEST analysis) and trends in the micro environment (competitors and customers)Segment a market based on relevant segmentation criteria - Select a target group based on a fit between company competences and market profitability Summarize the market analysis using the SWOT analysis.	The student should be able to: - Reflect on creation of an autonomous robot for a selected market - Reflect on software testing - Control and structure a project as it progresses - Reflect on the group performance and individual learning processes - Reflect on working cross cultural - Reflect on participation in peer review - Be able to identify relevant sources of information and assess their credibility and relevance - Develop a competitive marketing plan including strategic reflections, target market selection, an appropriate competitive strategy and a suitable marketing mix based on conclusions from the market analysis - Create a prototype of an exhibition stand, which is appropriate for the market.	Oral Examination 15 minutes group presentation of the project. This will be done in the form of an exhibition stand. 10 minutes individual examination in the SEP1 project (ENB and MAM related). 10 minutes individual examination in the course ENB1. Exam questions in individual parts are based on the project and course content. In case of reexam, each part can be examined separately. In case of failure of project part of exam, a new project must be conducted without supervision. Allowed tools: All Internal examiner Please note that re-examinations may take a different form than the ordinary exams. Re-examination Students who failed a semester project

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
						in January or June must attend an information meeting on the last Friday in June. At this meeting, the students will get information on specific deadlines as well as the process of re-exam. They will form new groups, if possible in relation to the number of failed students at the individual semesters. Based on the feedback, the students have received after the ordinary exam, they must prepare a new project, or the failed project must be improved. Deadline for hand in of the project is mid-August (exact date will be informed at the meeting). There will be no guidance in the period up to hand in. Oral assessment of the project takes place in September.
GBE-SEP2	Semester Project 2 (GBE-)	5	The students should acquire knowledge in project work, study new topics and apply theory learned in project methodology, engineering basics, marketing management, business communication, and technical drawing. The project is hands-on experience in practicing what the students have learned in engineering, business and communication. Besides, the students are expected to develop their personal skills, such as for instance how to cooperate, show responsibility,	Upon completion of the project SEP2 the students should have acquired skills in how to: Engineering: - search and study technical information - make technical drawings for production using 3D CAD - conduct practical tests and collect data - use collected data and make conclusions on the basis of this data - Marketing: make an analysis of a market for a selected country - develop a marketing strategy for the company - complete an international marketing plan including recommendations to the company for a possible	Upon completing the course, the students will have gained competences in identifying, drawing and applying suitable components in a machine design. Furthermore, the students will have competences in comparing, arguing for, and deciding on technical solutions. The students will also be able to analyse a foreign market, decide on a market strategy and complete an international market plan. Besides, the students will be able to communicate effectively and professionally using the correct syntax and terminology for technical language both	Oral Examination Group presentation based on a project report followed by an individual examination of all group members in a group session. Duration: Presentation 15 minutes and examination approx. 10 min. per student. Allowed tools: All. Internal examiner. Description of the exam:

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
			motivate themselves, etc. with the aim of reaching a good result of their project work.	penetration into the selected market - Business Communication: - plan and analyse the communication situation - structure the project report, and organize the text in logical, coherent sections. - write the project report in a professional style used in business communication and according to the guidelines for writing reports in VIA - use grammatically correct written English - present the results of the project work orally in a clear and concise language Process skills: draft a comprehensible group contract taking into account challenges from the first semester project - cooperate in teams - motivate themselves and others - be responsible for time management and prioritizing	orally and in writing. The student will also be able to interact and cooperate in a technical/business context with people from different cultural backgrounds.	Evaluation The evaluation of the project work is based on: A written project report, a process report, and technical documentation (appendices). An oral group presentation based on a project report followed by an individual examination of all group members in a group session. Examination The examination is an oral exam and consists of: A group presentation of the main conclusions of the project report and the process report (15) min. per group).An individual examination (approx. 10 min. per group member with the presence of the whole group) based on the project report and the general knowledge that the student has gained through the courses: SSE, SEP1, ENB1, ENB2, CAD, GBC1, GBC2, MAM1, MAM2. Grading criteria Each area will be evaluated according to its weight in the project: engineering 1/3, marketing 1/3, and Business communication and project methodology 1/3. Students receive one overall mark. Each area (engineering, marketing and business communication and project methodology) counts for 33,3 % of the

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
						overall mark. Both the written part and the oral part will be taken into consideration when the grade is given. Grades will be given according to the Danish 7-point grading scale. Deadlines for passing the course As described in the GBE curriculum.
GBE-SEP3	Semester Project 3 (GBE-)	10	The student will acquire knowledge in project work and new curricula as well as apply theory learned in project methodology, business economics and intercultural business communication. The student should acquire knowledge about how to: - Carry out research and studies on relevant cultural and economic topics with the purpose of setting up a subsidiary in a foreign country - Read the documentation on LEJOS - Make use of the facilities in Makerspace - How to drive, control and charge mini mobile robots - Follow the requirements for project writing in English - Make use of different academic writing requirements in terms of syntax, coherence and structure	Following the completion of the course, the student has skills in: - Research methods for relevant macro-economic data - Research methods, analysis and understanding of cultural similarities and differences in the selected countries Teamwork - Making actuals models using 3d print and laser cutting - Mechanical drive and lifting systems - Analyzing loads and strengths of simple frame and machine parts3D CAD modeling - Programming a Real-Time Embedded system - Using an UML Activity Diagram and an Class Diagram to model a self-designed system - Report writing in a clear and concise language, using correct English and in accordance with the guidelines for project writing.	Upon completion of the course, the student will have gained competences in finding and analyzing country specific macro-economic data in order to evaluate the business opportunities in a selected country. Besides, the student will be able to identify and explain cultural similarities and differences in the countries in question. The student will have gained intercultural competence which enables him/her to cooperate with foreign business partners and organisations as well as with colleagues and employees from another country. On the basis of the above macro-economic and intercultural analyses, the student will also have learned how to evaluate the business opportunities in a selected market, taking both the macro-economic and the cultural perspectives into consideration. Furthermore, the student has learned to	Oral Examination Individual oral examination without preparation based upon course assignment(s) Duration: App. 20 min (grading included) Allowed Tools: All Internal examiner

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
					transform the business opportunities into a tangible prototype of a system solution. The prototype demonstrates the functional usability and the possibility of realization for the solution. The student will gain competences in designing, modeling and dimensioning simple mechanical machine structures and combine standard machine elements to drive a unit forward.	
GBE-SEP4	Semester Project 4: Investment in renewable energy	5	The student should be able to understand: - 3D drawing (CAD)Software programming using Java & relational databases - Thermodynamics and electric circuits - Capital investment calculations for product development - Project methodology as well as project work skills	The student should achieve the skills to: - All students: Evaluate the financial elements of an investment - Use the project methodology based on the Engineering guidelines Software engineering students: Database operation (SQL)Java application Mechanical engineering students: Measure and calculate energy and power for solar energy systems	The student should be able to: - The students will be able to identify and solve cross-disciplinary problems in a group project - The students can handle both written and oral communication of project results	Oral Examination Individual oral examination without preparation based upon course assignment(s) Allowed tools: All Internal examiner Please note that re-examinations may take a different form than the ordinary exams. Re-examination Students who failed a semester project in January or June must attend an information meeting on the last Friday in June. At this meeting, the students will get information on specific deadlines as well as the process of re-exam. They will form new groups, if possible in relation to the number of failed students

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
						at the individual semesters. Based on the feedback, the students have received after the ordinary exam, they must prepare a new project, or the failed project must be improved. Deadline for hand in of the project is mid-August (exact date will be informed at the meeting). There will be no guidance in the period up to hand in. Oral assessment of the project takes place in September.
GBE-SEP5	Study Project: Free Innovative Product Design	10	- Key dimensions of project management skills in groups - Project planning - Innovation process - Applied theory from selected technical specialization (ICT/ME)	- Be able to generate ideas, develop concepts and make final systematic choices based on relevant requirements and criteria - Be able to choose theories, models and methods relevant to the problems in the project - Be able to design, dimension and document machines / software in accordance with rules and regulations - Demonstrate analytical, rational as well as innovative thinking - Demonstrate self-initiative, interpersonal skills, criticism, self-criticism, desire to learn.	- Project management skills - Define, manage and implement projects bridging technical and business issues - Apply input from business/marketing part to technical solution and vice versa - Make methodical decisions based on discussion and analysis of relevant models and theories - Focus on the relevant issues to provide a coherent solution - Develop technical solutions that both meet the needs of the market and have business potential.	The study project report must be handed in on time in order to enroll for the examination. The groups will present the business plan (15 min.) followed by a group examination covering both the technical and business subjects (approx. 45 min). it should be noted that the grading is still individual (not a group grade). The basis for the examination is the project report. The examination can sway the project grade up or down for individual students depending upon the performance.
GBE-SEP7	Semester Project - UN 17 Sustainable Development Goals and Environmental Social Governance	15	Students will achieve knowledge within the areas of: - Key dimensions of project management skills in groups. - Technical theory & methods from selected specialization (ICT/ME) relevant for the project in question. - Business and cultural theories and methods relevant for the project in question. - UN 17 Sustainable Development Goals.	After completion of the project, the students will be able to: - Evaluate the relevance and importance of UN 17 SDG's in connection with business strategy. - Apply relevant project methodology and project management tools in a cross-cultural context. - Choose and apply relevant technical tools and methods from the selected specialization (ICT/ME) to solve a specific product development task.	After completion of the project, the student should be able to: - Give recommendations to how attention to Environmental and Social Compliance and UN 17 SDG's in product and business development can be used in strengthening of the strategic positioning of a company. - Identify and solve cross-disciplinary problems in a group project. - Plan and implement a project plan in a cross-cultural context.	Exam prerequisites: Course assignment handed in before deadline Exam type Oral Examination. Internal examiner. The project report must be 30 – 40 standard pages (exclusive appendices etc.) and must follow the "Guidelines for Engineering Projects.

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
				- Outline an implementation plan for a project in a cross cultural context that fulfill the guidelines in UN's SDG no 17- - Revitalize the global partnership for sustainable development. - Apply the chosen second foreign language for research in an academic context.	- Formulate a solid Project Description for the 9th semester Bachelor project.	Group presentation followed by an individual examination with the presence of the whole group. Duration presentation 15 - 20 minutes. Allowed Tools: All. Grading criteria Examinations account for 100 % of final grade The evaluation of the project work is based on: The written project report including a process report and technical documentation A presentation of the project An oral examination The evaluation will be based on the demonstrated ability to apply Project Methodology within three main areas of the GBE study: Applied engineering Applied business Applied language and culture The exact distribution of the three elements mentioned above in the final grading will depend on the specific project problem, but all three elements have to be included and acceptable performance in each area individually is required to pass the course.

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
GBE-SPA1	Spanish Culture and Society	5	After the course the students should have knowledge about, understand and reflect on the Spanish language, including syntax, phonetics, grammar, and semantics historical, social, cultural, and political conditions in Spanish-speaking areas.	After the course the students should be able to: - communicate in Spanish by using rather simple sentence structures, primarily in oral Spanish and secondarily in written Spanish - understand spoken Spanish - read, understand and discuss authentic texts in Spanish about cultural, social or political issues - make presentations on cultural, social or political issues - write simple texts in Spanish - search information in Spanish on cultural, social and political issues and present the results of this in Spanish.	After the course the students should be able to: - communicate in a a rather simple Spanish - function and cooperate with people with different educational, language, and cultural backgrounds - structure own learning and critically acquire new knowledge within relevant engineering areas - use the knowledge of the Spanish language and the Spanish society as well as the Spanish-speaking areas in practice in an international context.	Oral examination Individual oral examination based upon a subject found by draw. Preparation time 40 minutes. Allowed tools: All NB: Internet access not allowed except studynet and online dictionaries. External examiner. Please note that re-examinations may take a different form than the ordinary exams. The course must be passed before the limit set in the course curriculum.
GBE-SPA2	Spanish Business Language I	5	The students should have knowledge about/understand and reflect on: The Spanish language including basic grammar, sentence structure, vocabulary and pronunciation Knowledge about business and industry in Spain. Topics relating to business and industry in other Spanish-speaking countries can also be included	After the course, the students should be able to: - Use relevant business terminology - Read and understand authentic texts in Spanish on issues relating to business and industry - Find, use, and discuss information in Spanish on business subjects - Make presentations in Spanish on various subjects - Prepare simple texts in Spanish with special focus on the global business engineer's professional area.	After the course, the students should be able to: - Communicate in Spanish in a clear language, orally and in writing, in international contexts - Function and cooperate with people with different educational, language, and cultural backgrounds - Structure own learning in an effective way and critically acquire new knowledge within relevant engineering areas - Put the knowledge of the language and the Spanish society and the Spanish-speaking countries into practice in an international context.	Oral Examination The examination is based on an unseen text and questions in relation to the topics of the course. All aids are allowed during preparation. External examiner. Please note that re-examinations may take a different form than the ordinary exams.
GBE-SPA3	Spanish Business Language II	5	After the course the students should have knowledge and reflect on the Spanish language, including syntax, phonetics, grammar, and semantics Spanish industry and business life Intercultural affairs and business protocol in Spain and/or Spanish-speaking countries	After the course, the students should be able to: - read, understand and discuss texts in Spanish on social, business and engineering issues - be confident in using appropriate terminology within subject areas discussed in class - negotiate with Spanish-speaking cooperation partners - make presentations in Spanish	After the course, the students should, to a high extent, be able to: - communicate in a clear language, orally and in writing, in international contexts - function and cooperate with people with different educational, language, and cultural back-grounds - structure own learning in an effective way and critically acquire new	Oral Examination The student is examined on the basis of: 1) A presentation and discussion of a previously unknown text handed out prior to the preparation, and one or more questions to the course curriculum. OR

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
			How to make presentations.	- express themselves orally in Spanish with a rather high level of accuracy.	knowledge within relevant engineering areas - put the knowledge of the language and the Spanish society and the Spanish-speaking countries into practice in an international context.	a negotiation case where the student plays one part and the lecturer the other part, and one or more questions to the course curriculum. 2) A presentation of the semester project SEP5 (10 min. power point presentation). All aids are allowed during preparation. Please note that re-examinations may take a different form than the ordinary exams.
GBE-SSE1	Study Skills for Engineering Students (GBE)	5	The student should be able to: - Explain the study activity model and the SOLO taxonomy - Differentiate between different learning styles and identify own preferred learning style - Understand the concept of plagiarism - Define the characteristics of reliable sources (source criticism) - Outline cultural traits that can influence team work in a project - Outline the stages of team development (such as the Tuckman stages) - Explain the strengths and weaknesses of Problem-Based Learning (BPL)Describe the project phases, including problem analysis, problem formulation, project planning and implementation - Understand the role of the supervisor and project supervision in general	The student should be able to: - Apply good study techniques for planning, reading and note-taking in an intentional manner - Apply an appropriate project methodology based on the GBE Engineering guidelines - Develop a problem analysis - Understand and apply generic tools for project planning and execution including the IT tools MS Teams, Planner and Gantt charts	The students should be able to: - Reflect on active learning and on how to take responsibility for own learning - Analyse and apply team dynamics, such as communication, motivation, decision-making and conflict resolution - Reflect on the importance of work style and behaviour, team roles and culture - Generate a project outcome (report, appendix etc.) that demonstrates effective communication skills.	Approval/non-approval. Students who fail to comply with the above approval criteria, must pass a written test (a replacement test). The competences achieved in this course will be assessed at the project exams. The course must be passed before failing three attempts. Please note that re-examinations may take a different form than the ordinary exams.

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
			- Understand the importance of innovation and innovative processes and the principles behind divergent and convergent phases.			
GBE-SSM1	Personal Selling and Sales Management	5	The different kinds of sales jobs and personal characteristics of successful sales persons Understand the significance of personal selling to the sales of the company, its relation to other the other elements of the promotion mix of the company and its marketing strategy The connection between the purchasing behavior of the customer and the right sales strategy The buying center concept and factors affecting the customer decision-making process Prospecting: how to find new sales leads and methods to qualify them as potential customers A deep understanding of the key phases in the personal selling process: 1. The opening at a sales meeting 2. Need and problem identification 3. Presentation and demonstration of relevant solution 4. Effective techniques to deal with buyers' objections 5. To negotiate a deal 6. Techniques to close a sale (get the order) 7. Follow-up on the sales meeting	Create a prospecting plan to find new customers Plan and design the sales meeting by finding and using relevant information Determine the members of the 'buying center', their needs and purchase motivations How to determine customer value and create a strong value proposition Prepare and present a sales presentation in a convincing manner Be effective in sales negotiation and handling of objections Be able to close a sale Manage customer relationships to maximize long term customer satisfaction	Be able to effectively prospect for new customers Overall to plan and conduct a professional sales meeting covering all the steps in the process from the opening over need and problem identification, presentation, handling of objections, negotiation, closing the sale to follow-up on the meeting Prepare and conduct a sales presentation: visual, verbal, and nonverbal communication of information using professional selling skills Use an appropriate selling strategy according to the needs of the customer, the characteristics of the product in question, the competition and the objectives of the selling company Be effective in building, maintaining and extending customer relationships Function as the market expert regarding information on products and competitors to both the selling and the buying organization	Prerequisites for exam: None Exam type: Individual oral exam with internal examiner based on the written report of a sales case handed in before deadline set by the teacher and the curriculum. Duration – 20 minutes per student including evaluation. Tools allowed: All Re-exam: As ordinary.

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
			Basic knowledge about sales organization and sales administration including international aspects Define customer value from the buyers perspective How to transform product features into customer benefits Building, maintaining and extending customer relationships Awareness of ethical practices in personal selling			
IT-BUI1 (enrollment 2019)	Business Intelligence	5	Students will obtain knowledge about understanding, reading, and displaying data from a dimensional model, such as a star scheme or data cube.	Data migration using integration services Designing paginated reports in Reporting services Scheduled jobs in SQL server Creating analyses in Power BI Creating cubes in Analysis services		Oral examination based on the course assignment. Approximately 20 minutes incl. discussion of examinee's performance, without preparation.
IT-BUI1 (enrollment 2020)	Business Intelligence	5	Students will obtain knowledge about understanding, reading, and presenting data from a dimensional model (such as a star schema or data cube) and other data models • Knowledge about building data products for operational vs real-time systems	Data migration using data integration tools • Create Data pipelines to cleanse data and move it into a data warehouse • Create KPIs and measures • Create data analyses, presentations and dashboards with Business Intellligence tools • Create data structures for analysis purposes with selected tools • Create, deploy and manage reports	• Evaluate pros/cons of different BI products, architectures and approaches	Exam prerequisites: In order for the student to qualify for the examination, the course assignment must have been handed in on time and approved. Exam type: Oral examination based on the course assignment. Approximately 20 minutes incl. discussion of examinee's performance, without preparation. Internal assessment.
IT-DAI1 (enrollment 2019)	Data Analytics Infrastructure	5	Having completed this course, students should be able to describe basic techniques within the	Having completed this course, students should be able to:	Having completed this course, students should be able to	Oral examination

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
			field, and argue the choice and applicability of these for different use scenarios. This includes: Use scenarios for analytical data processing, differences to transactional processing Types of analytical data processing, such as reporting and visualization Sources of data for analytical processing Server and locally hosted platforms for data storage and analytical processing Modelling techniques for designing data models for integration of multi-source data, including structured, semi-structured and unstructured data, and for modelling time-variant data/history Design of systems for data acquisition, validating and cleansing data, integration and publishing of data.	Design and implement data models for integrating multi-source data, including dimensional data modelling, for structured and semi structured data Design and implement data models for time-variant data Design, implement and test systems for data acquisition, validation, integration and delivery from multiple sources and platforms Design, implement and test basic descriptive statistical analysis on integrated data Design, implement and test basic visualizations and graphs of data and analysis results.	Discuss and argue pros, cons and trade-offs of choices Use basic statistics and visualization to find and explain patterns of information in data.	Individual oral examination without preparation based upon course assignment(s) Allowed Tools: All Internal Examiner
IT-DAI1 (enrollment 2020)	Data Analytics Infrastructure	5	Having completed this course, students should be able to describe basic techniques within the field, and argue the choice and applicability of these for different use scenarios. This includes: • Application of analytical data processing, and differences to transactional processing	Having completed this course, students should be able to: • Design and implement data models for integrating multi-source data, including dimensional data modelling, for structured and semi structured data • Design and implement data models for time-variant data	Having completed this course, students should be able to • Discuss and argue pros, cons and trade-offs of choices • Use basic statistics and visualization to find and explain patterns of information in data • Evaluate and act upon peer feedback	Permit criteria for attending examination • Mandatory course activities completed • Course assignment handed in before deadline Type of exam Individual oral examination without preparation based upon course assignment(s), covering mandatory course work and theory covered in the course.

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
			• Types of analytical data processing, such as reporting and visualization • Sources of data for analytical processing • Server and locally hosted platforms for data storage and analytical processing • Modelling techniques for designing data models for integration of multi-source data, including structured, semi-structured and unstructured data, and for modelling time-variant data/history • Design of systems for data acquisition, validating and cleansing data, integration and publishing of data.	• Design, implement and test systems for data acquisition, validation, integration and delivery from multiple sources and platforms • Design, implement and test basic descriptive statistical analysis on integrated data • Design, implement and test basic visualizations and graphs of data and analysis results. • Give relevant peer feedback on handins and exercises throughout the semester		Duration (grading included) app. 20 min/ 5 ECTS. Allowed Tools: All Internal Examiner
IT-DBS1 (enrollment 2019)	Database Systems	5	Having completed this course, students will be able to: - explain the relationship between relational algebra and SQL - explain the relational model - explain the 3 normal forms - explain keys in relational databases - explain joins - explain transactions	Having completed this course, students will be able to - create ER-Models with UML - use Data Definition Language (DDL) to create databases - use Data Modeling Language (DML) to manipulate data in a database - use the mapping method to convert ER-Models to Relational Models - use normalisation to normalise a database schema to 3rd normal form - create SQL statements to create, replace, update and delete data in a database - use keys in relational databases - use joins	Having completed this course, students will be able to: Design and implement a database schema on the 3rd normal form Use a database in application development	Criteria to qualify for the exam: Course assignments handed in before deadline. The student must have an attendance of at least 75% in order to qualify for the exam. Students who do not have at least 75% attendance will automatically fail the ordinary exam. Examination Duration: 4 hours Digital written examination (2 parts): Part 1: Multiple choice and written answers; 1 hour without aids Part 2: Design and implementation; 3 hours with all aids, including internet connection Internal examiner

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
						Please note that re-examination may take a different form than the ordinary exam.
IT-DBS1 (en-rollment 2020)	Database Systems	5	Having completed this course, students will be able to: • account for the relationship be-tween relational algebra and SQL • define the relational model • distinguish the 3 normal forms • classify keys in relational data-bases • explain indexes	Having completed this course, students will be able to • use relational modelling to model busi-ness cases • use UML to document ER-Models • use Data Definition Language (DDL) to create databases • use Data Modeling Language (DML) to manipulate data in a database • use the mapping method to convert ER-Models to Relational Models • use normalisation to normalise a data-base schema to 3rd normal form • create SQL statements to create, re-place, update and delete data in a data-base • use keys in relational databases • use joins to combine data • use transactions to prevent data cor-ruption • create triggers • create views	Having completed this course, students will be able to: • Design and implement a database schema on the 3rd normal form • Use a database in application devel-opment	Criteria to qualify for the exam: • Course assignments handed in before deadline • The student must have an attendance of at least 75% in order to qualify for the exam. Students who do not have at least 75% attendance will automatically fail the ordinary exam. Exam Duration: 4 hours Digital written exam (2 parts): Part 1: Multiple choice and written an-swers; 2 hours without aids Part 2: Design and implementation; 2 hours with all aids, including internet connection External assessment Allowed tools: Textbook, written or printed notes, and files saved to personal computer. Re-exam: Conducted as the ordinary exam.
IT-DIM1	Digital Multi Media	5			Having completed this course, students should have profound knowledge of: • Computer Graphics • Design Principles for multimedia • Video, Animation and Sound • XML and Multimedia	Evaluation is based on a written group course assignment, where it must be clearly marked which sections of the course assignment each group member contributed with. Furthermore, each group member must also hand in an additional 1-2 pages of

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
						individual reflections on the work they have done in the course assignment.
IT-DNP1 (2019 enrollment)	.NET Programming	5	The student will be able to: - Describe the fundamentals of .NET development and the common type system - Identify and describe .NET technologies relevant to web application development	The student will be able to: - Write and debug C# code - Implement RESTful Web Services in relation to a distributed system - Consume RESTful Web Services - Utilize asynchronous programming - Create and interact with a relational database using an Object - Relational Mapping library - Define and implement basic authentication and authorization - Navigate and use the managed .NET API - Create and consume class libraries - Compare object-relational mapping to traditional data access techniques - Implement a Web App within ASP.NET	The student will be able to: - Implement a robust, error-safe system - Implement console applications, web applications and web services as part of a distributed system with - Server-side and client-side C#-programming - Data persistence using object-relational mapping - User management, including authentication and authorization - Analyze and evaluate the relevance of .NET technologies when designing software applications - Apply best practices when developing .NET apps	Exam prerequisites: Course assignments handed in before deadline. The student must have an attendance of at least 75% in order to qualify for the exam Exam type: Individual written examination Duration: 3 hours Programming exercises Internal examiner Tools allowed: All aids, including internet connection Re-exam: The re-examination may take a different form than the ordinary exam
IT-DNP1 (2020 enrollment)	.NET Programming	5	The student will be able to: - Describe the fundamentals of .NET development and the common type system - Identify and describe .NET technologies relevant to web application development	The student will be able to: - Write and debug C# code - Implement RESTful Web Services in relation to a distributed system - Consume RESTful Web Services - Utilize asynchronous programming - Create and interact with a relational database using an Object - Relational Mapping library - Define and implement basic authentication and authorization - Navigate and use the managed .NET API - Create and consume class libraries - Compare object-relational mapping to traditional data access techniques	The student will be able to: - Implement a robust, error-safe system - Implement console applications, web applications and web services as part of a distributed system with - Server-side and client-side C#-programming - Data persistence using object-relational mapping - User management, including authentication and authorization - Analyze and evaluate the relevance of .NET technologies when designing software applications - Apply best practices when developing .NET apps	Exam prerequisites: 1. Attendance (≥ 75%) 2. Course assignments handed in before deadline. If the exam prerequisites are not met, the student must complete a written assignment in WISEflow to qualify for the re-exam. This assignment will be scheduled after the ordinary exam. Type of exam: Individual written exam, 3 hours, consisting of programming exercises Internal assessment

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
				- Implement a Web App within ASP.NET		Tools allowed: All aids are allowed included access to online material. However, it is not allowed to use AI tools such as ChatGPT and similar AI and Machine Learning driven tools and chatbots. Re-exam: Re-exams may be oral.
IT-ERP1 (enrollment 2019)	ERP systems SAP ABAP/4 Programming	5	Having completed this course, students will be able to: - Understand the ABAP Workbench. - Create basic ABAP Programs. - Understand the control flow and structures in ABAP	Having completed this course, students will be able to: - Create Database with domains, data elements and tables - Retrieve Data from the Database with open sql. - Develop a simple ABAP Programs with modularization. - Develop a DYNPRO with navigation (CRUD-functionality) - Develop reports with selection screen, alv-list, etc.	Having completed this course, students will be able to: - Use the fundamental concepts of the ABAP programming Language - Create simple application programs with user dialogs and database connections. - Trace the flow of a program and troubleshoot simple problems. - Describe change management for new systems. - Use ABAP Workbench and basic ABAP language elements. - Explain the relationship and difference between the classical procedural programming model and the object-oriented programming model in ABAP/4. - Apply screen flow logic and working with external data.	Internal examination The evaluation of the course is based on mandatory course work (50%) and the oral exam (50%) at the end of the course. Only students with approved course work will be allowed to attend the exam. The exam is oral and it takes 20 minutes per student. The exam is in two parts. First part is a presentation and discussion of selected parts of the course work. Second part is drawn question from the theory of the course.

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
					- Apply different tools and techniques available to implement dataflow in an ABAP program with database. - Design and implement an object-oriented SAP application with a database and ALV Grid.	
IT-IDX1 (enrollment 2019)	Interaction Design	5			Gain skills within interaction design and usability evaluation. Students will achieve: - knowledge of and experience in User eXperience Design (UX) including knowledge of and experience in participatory design workshops - knowledge on planning, preparation, implementation, analysis, and documentation of user-based usability evaluation - understanding of and practical experience with the interplay between usability evaluation and interaction design in an iterative design process	Exam prerequisites: None Type of exam: Individual oral exam, 20 minutes, without preparation. Exam is based on a question from the course syllabus and based on the course assignment. Internal assessment. Tools allowed: N/A Re-exam: Same as the ordinary exam.
IT-MAL1 (enrollment 2019)	Introduction to Machine Learning	5	After having successfully completed the course, the student will have gained knowledge about algorithms, methods, techniques, tools, and applications within the following fundamental machine learning methods: - predictive methods, e.g. regression and classification - descriptive methods, e.g. clustering and PCA	After having successfully completed the course, the students should be able to apply the algorithms, methods and models from the above-mentioned areas to identify, analyse, evaluate and make suggestions for solving specific data-based issues. They must be able to argue for the relevance of the chosen algorithms as well as for the proposed solution. In addition, they must be able to reflect on the importance of the context in which the solution is included.	After completion of the course, the goal is that the students have acquired the competences to: - Make informed choices about the use of machine learning techniques - Parametrisise machine learning algorithms for a given data material	Exam prerequisites: At the end of the course, the student must upload a 1-page summary of each of their 6 assignments as well as a 2-page summary of their group project. The summaries must include a brief description of: 1) the assignment problem 2) how the assignment was solved, e.g., data acquisition, data preparation, feature engineering, feature extraction, etc.

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
			- deep learning methods, e.g. neural networks. - clustering methods, e.g. partitional and hierarchal clustering The students must be able to relate critically and reflectively to the above topics; in particular, it is important that they become proficient in selecting the right type of machine learning method for use in a given context.	Specifically, it is expected that after completion of the course the students will be able to: - Understand and apply a number of machine learning algorithms to both unstructured and structured data examples - Understand and compare the algorithms behind different data mining and machine learning methods - Match and possibly combine methods for practical use in an appropriate context.	- Design and develop a complete solution for a complex, realistic problem - Communicate and discuss the solutions with professionals and non-specialists.	3) the algorithms that were used to solve the problem. 4) the performance of the final model 5) a reflection of the learning outcome of solving the assignment. Type of exam: The exam is a 20-minute oral examination that departs from one of the six assignments that the student made during the semester. The exam will also include an examination of the group project report. The final grade will be based on an overall assessment of the six assignments, the group project report, and the oral examination. Internal assessment Tools allowed: N/A Re-exam: Same as the ordinary exam.
IT-NSQ1	No-SQL versus relational databases	5	The student should be able to • describe document-based and graph databases • explain updating and querying in different database paradigms • explain updating and querying in GraphQL • explain schemas and constraints in non-relational databases • compare relational and different non-relational approaches to database design	The student should be able to apply • modelling techniques in document-based and graph databases • schemas and constraints to enforce designs in a no-SQL database • APIs and languages to maintain and query databases • setting up No-SQL databases in the cloud	At the end of the course, the students should be able to • make an informed choice of database management system • design and create a data model in the chosen database system • set up a cloud environment to use for the data model	Oral examination based on a question from the course syllabus based on the course assignment. Approximately 20 minutes (including discussion of examinee's performance) without preparation. Internal exam

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
IT-PME1	Process Management for ICT Engineering	5	After successfully completing the course, the students will have gained knowledge about: - How to ensure quality in projects - How to improve your project performance How to handle change management in a project.	After successfully completing the course, the student will be able to: - Apply techniques and results from Capability Maturity Model Integration (CMMI) to solve challenges in project processes - Apply techniques and results from Lewin model to handle change management in project - Apply "How to break software" to prevent making mistakes in your project - Be able to describe and make use of testing concepts Use of terminology to kick-start Bachelor project.	o complete this course the students must make hand-in: Requirement Specification - IEEE 830 standard" document for a project Test Specification - IEEE 829 standard" document for a project Project relations to CMMI model" document for a project.	The course is assessed on the basis of 3 individual assignments, weighing 25%, 30% and 45%, respectively. If the course is failed, the student must go for internal oral re-examination.
IT-RWD1	Responsive Web Design	5	Having completed this course, students will have the knowledge to: • Describe the different file formats used in web development and their purpose. • Reproduce webpage layouts using HTML5 and CSS3 when presented with images/screenshots of other websites. • Select appropriate attributes for HTML5 elements. • Explain the difference between responsive and non-responsive websites. • Test HTML5 files for errors using the W3C markup validator. • Account for the difference between the JavaScript and Java programming languages.	Having completed this course, students will have the skills to: • Create web sites using Hyper Text Markup Language (HTML5). • Use simple and advanced CSS3 selectors and properties to style webpages. • Apply the Bootstrap grid framework to create responsive websites. • Utilize the Bootstrap classes to apply styling to responsive websites. • Implement JavaScript functions to add functionality to websites. • Use XMLHttpRequest to read content from an external source and integrate this content into a website. • Select HTML elements and apply jQuery animations to the selected elements to make websites interactive.	Having completed this course, students will be able to: • Design and implement platform independent web applications.	Prerequisites for exam: If the following requirements are not met, the student will not qualify for the exam: The student must have an attendance of at least 75%.Mandatory assignments handed in before deadline and accepted. Exam type: Digital written examination duration of 2 hours (2 parts): Part 1: Multiple choice questions 30 minutes Part 2: Short answer questions 90 minutes (explaining and writing code) External assessment. Tools allowed: Part 1: without aids Part 2: all aids allowed - including internet connection

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
						Any types of communication between students or between a student and an external party is prohibited and will be considered a violation of the exam rules. Re-exam: Please note that re-examinations may take a different form than the ordinary exams.
IT-SDJ1	Software Development with UML and Java	10	he student should be able to: - Identify the Java lexical structures: keywords, separators, operators, identifiers, literals and comments. - Explain details of UML class diagrams - Identify selection and loop structures in UML activity diagrams	The student should be able to: - Construct Java programs with proper choice of selection and loop structures. Create and use objects in Java - Implement classes in Java using the object oriented concepts: encapsulation, inheritance and polymorphism - Implement one-to-one relations and differentiate between association, aggregation and composition Implement one-to-many relations using array structures and a simple collection class. - Implement exception handling for different types of exceptions - Implement persistence in text and binary files - Construct simple event-based GUI applications - Construct Java source code documentations - Interpret UML class diagrams, and construct corresponding Java code	The student should be able to: - Exemplify and discuss basic object-oriented concepts, including encapsulation, relationships, inheritance and polymorphism - Implement small scale systems from UML class diagrams, and construct related GUIs	Permit criteria for attending examination: Mandatory course activities completed. The student must have an attendance of at least 75% in order to qualify for the exam. Students who do not have at least 75% attendance will automatically fail the ordinary exam. * Individual oral examination based upon a subject found by draw. * No preparation. Oral examination where the student will pick an unfamiliar programming exercise at random. The student must explain the UML involved and demonstrate how to perform the programming task using a laptop and/or the blackboard. The time allotted for the examination is 30 minutes including assessment. The grade for the oral examination counts for 80% of the final grade while

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
						the remaining 20% comes from a test conducted in the middle of the course. * Allowed tools: All * External examiner.
IT-SDJ2	Software Develop-ment with UML and Java 2	10	The student should be able to un-derstand: • System architecture • Various methods for testing • Concurrent programming • Design patterns • Client/server structure	The student should achieve the skills: • Implement design patterns in Java • Test software using different testing techniques, including (but not limited to) JUnit testing, System testing, etc. • Implement thread-safe classes and multi-threaded programs • Make programs communicate using client-server technologies	The student should be able to: • Implement programs in Java using de-sign patterns, and evaluate which to use • Test software using relevant testing techniques • Develop flexible java code using inter-faces • Implement thread-safe classes and multi-threaded programs • Implement client-server systems	Criteria to qualify for the exam: • Course assignments handed in before deadline • The student must have an attendance of at least 75% in order to qualify for the exam. Students who do not have at least 75% attendance will automatically fail the ordinary exam. Exam type: • Individual oral examination without preparation based upon course work. • The student will draw from a pool of previously known questions. • The student will explain concepts and theories from the course, using the course work as reference. • The student will start with a prepared presentation. • External assessment. Allowed tools: NA Re-exam: Conducted as the ordinary exam.
IT-SWE1	Software Engineering	5	The student should be able to ac-count for: • Abstraction • UML (selected diagrams) • S.O.L.I.D principles • Unified Process • Scrum	The student should achieve the skills to: • Analyse a problem and document the analysis- and design-process with text and UML • Apply use of Scrum • Apply use of Unified Process	The student should be able to: • Analyse a problem– what is the prob-lem to be solve? • Derive a requirement specification with Use Cases and non-functional re-quirements • Plan tests by Test specifications	Criteria to qualify for the exam: • Course assignments handed in before deadline • The student must have an attendance of at least 75 % in order to qualify for the exam. Students who do not have at

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination

			• Design principles
			• Architectural design
			• Requirement capturing
			• Analysis vs. Design models
			• The difference between software development and coding
			• Test descriptions
			• How to conduct a test following a test description
				• Use UML to document requirements, analysis, and design artefacts
				• Use agile software development with Unified Process in combination with Scrum
				• Create a Domain model from a problem description, requirement specification and understand the elements in the resulting Domain model
				• Create a design model and understand the elements within it
				• Apply the S.O.L.I.D principles on a design model
				• Design for test
				• Create test descriptions
				• Create architectural design models
					• Analyse and design a project to be implemented in teams with many participants and stakeholders
					• Work in a Scrum team
						least 75 % attendance will automatically fail the ordinary exam.
						
						Exam type:
						Internal assessment.
						IF you are full degree Software Engineering student:
						• SWE 1 is evaluated together with SEP 2 project.
						• The SEP 2 project and the exam must demonstrate understanding of SWE 1 skills and competencies and their use in practice.
						During the SEP 2 exam, specific SWE 1 questions will be asked
						ELSE
						Individual oral examination without preparation, where 50% of the grade is based on examination of one or more course assignments and 50% of the grade is based on a drawn question.
						ENDIF
						
						Allowed tools:
						All
						
						Re-exams:
						Individual 15 minutes oral examination without preparation, where 50% of the grade is based on examination of one or more course assignments and 50% of the grade is based on a drawn question. The questions will be known before the examination.

IT-WEB2	Web Development 2	5	After successfully completing the course, the student will have gained knowledge to:	After successfully completing the course, the student will have acquired the skills to:	After successfully completing the course, the student will have acquired competencies in analyzing, designing	Exam prerequisites:

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
			- Explain scope and closures in JavaScript - Compare dynamically and statically typed languages - Describe the JavaScript object model - Explain how 'this' works in JavaScript - Outline how prototypes, constructors & the class keyword are used in creating JavaScript objects - Describe how modules work in JavaScript - Compare the use of object-oriented and functional programming paradigms in JavaScript - Explain how concurrency works in JavaScript - Compare unidirectional and bidirectional dataflows - Outline the differences between local and global state management - Compare various rendering patterns including client-side-, server-side- and static rendering - Explain how the canvas element works - Summarize the basics of TypeScript	- Manipulate web pages using JavaScript - Use various JavaScript expressions and operators such as destructuring assignment, spread syntax, rest parameters, short circuit operators and optional chaining - Utilize factory functions to create objects in JavaScript - Make use of concatenative and prototypal inheritance in JavaScript - Apply higher-order functions to abstract over actions - Use callbacks, promises and async/await for asynchronous programming - Organize and clarify code with object-oriented and functional programming techniques - Consume webservices using fetch & XMLHttpRequest - Enhance the development process of web applications with built tools like package managers, module bundlers, preprocessors and task runners - Built single page web applications using React - Work with client side routing in a web application - Test the functionality of web applications using unit-, integration- and end-to-end tests - Apply patterns and best practices to measure and improve web performance	and constructing web applications using JavaScript and modern front-end frameworks.	If the following requirements are not met, the student will not qualify for the exam: - The student must have an attendance of at least 75% - The student must have all compulsory assignments approved Exam type: Individual written examination Duration: 2 hours External examiner Tools allowed: Without aids Any type of communication between students or between a student and an external party is prohibited and will be considered a violation of the exam rules. Re-exam: Please note that re-examinations may take a different form than the ordinary exams.
IT-WEE1	Web Engineering Processes	5			Having completed this course, students should have a solid knowledge about:	Oral examination. Approximately 20 minutes (including discussion of examinee's performance). Based on a

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
					The process of developing Web applications Creating Web applications with database connection in ASP.NET and C#	presentation and discussion of the course project.
ME-DYN1	Dynamics	5	The students will get knowledge about: Units, the kinematics of parti- cle motion, force and accel- eration for parti-cles, principle of linear im- pulse and momentum for particles, mechanical energy, and basic theory of fixed axis rota- tion for rigid bodies.	After completing the course, the stu- dent will be able to: * Use units consistently and perform unit conversions * Apply kinematic relations to the de- scription of particle motion. * Perform absolute dependent mo- tion analysis. * Account for the forces acting on a particle and draw a proper free-body diagram. * Set up and solve the equations of motion for particles and for simple systems of particles. * Describe the concepts of kinetic energy, work and potential energy and apply these to particle dy-nam- ics problems. * Write well-structured Mathcad scripts for performing and document- ing the solution of problems in- volving particle dynamics. * Solve simple dynamics problems for fixed axis rotation of rigid bodies	After completing the course, the stu- dent can: * Identify which parts of the acquired knowledge and skills that are rele- vant to a given, simple real-world mechanical problem. * Model real-world problems using the acquired knowledge and skills. Expand her/his knowledge on dy- nam- ics in more advanced courses.	Requirements for attending exam There will be a mandatory course work corresponding to a minimal workload of 10 hours for the student. If the course work is not handed in and approved by the deadlines set by the teacher, the student has used one exam attempt. New deadlines for hand-in and approval will then be set. Type of examination Written 4 hours exam. If the student chooses to answer the exam using pen and paper, he or she must scan the solution sheets after the 4 hours. Scanners will be provided. Allowed tools All usual aids Re-examination Please note that the school can de- cide that the re-examination can be oral.
ME-AMD1 (en- rollment 2020)	Automation, Mechanical Design	5	The students shall gain knowledge in how mechanical and hydrostatic drives are build, work and can be used in machine con- structions of mobile equipment. Students will know about:	The student will gain skills in - Selecting machine elements and use these for the purpose of automation tasks. - Basic setups to produce complex track structures for mechanical machines.	- The student will understand how anal- ysis of mechanical and hydrostatic drives are to be carried out in order to find a solution. - The student will be able to explain the theory behind the calculations for a complex ma-chine system.	Requirements for attending exam None Type of examination: 1 on-line course test in end of the se- mester. Exam time: 60 minutes. No censor

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
			* Design and dimension of Hook's joints. * Equation system and design of planet or epicyclical gears. * Control and regulation of mobile hydraulic systems for open and closed hydraulic circuits. * Complex hydraulic circuits with load sensing, priority and combined linear and rotational actuator systems.	- Analyse of simple PLC program to predict the output.	- He/she will collect analysis results and combine these to describe the design for making a complex system. - They will be able to communicate their needs to suppliers of machine elements, and be able to find these suppliers through relevant channels. - The student will be able to evaluate different possible solutions, to set up the most optimal system in a given situation.	Tests account for 100 % of final grade Allowed tools: Personal notes Laptop Re-examination: As ordinary
ME-CAD2	Advanced Designing in 3D-CAD	5	The student will acquire knowledge and become confident with the use of the software Autodesk Inventor on a more advanced level. Most of the following topics will be covered: - Sheet Metall - Parts and I - Assemblies (Family members) – based on parametersI - Features and feature reuse - Use of Content Center - Publishing to the Content Center - Assembly Functions and assembly reuse - Frame Generator - Weldment - design and documentation - Plastic Design - Surface Technology and Advanced Modelling - Dynamic Simulation	The student will gain skills to handle and use a 3D CAD system in an engineering professional way and will be able to understand and select relevant tools and technologies	Use and Understand the role of 3D CAD technology in a deeper context regarding the interface and link to Manufacturing, Value Chain Management and Product Data Management.	Prerequisites for exam: Mandatory assignments handed in before deadline and accepted by the lecturer. Any tests in laboratory accomplished and accepted. Exam type: The evaluation is divided into 2 stages: The first stage (counting 40%) is based on a 2 hour exam in the usage of the CAD software. The second stage (counting 60%) is based on the final and group based group assignemnt handed in the end of the course. To pass the course both stages must be passed with a minimum of 50% approved. Censor: Internal Tools allowed: All

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
			- Design Accelerator (optional)Rendering and animation (optional)Manufacturing and CAM Programming incl lab exercises (optional)			Re-exam: Same as ordinary.
ME-DES1 (enrollment 2020)	Design of Energy Systems	5	The student will acquire knowledge in, * Refrigeration plants * Heat pumps * Refrigerants * Energy efficiency and impact on the environment * Cooling load * Air conditioning processes	The student will be able to analyse the thermal load for an energy plant and on this basis combine process theory and common dimensioning practice to design an energy efficient cooling plant or heat pump with low environmental impact.	The student will obtain competences to communicate about designs of different types of energy plants. Fur-thermore, the student will be able to design simple energy plants in a methodical way and more complex systems in co-operation with energy engineers.	Prerequisites for exam: Mandatory assignments. If the assignments are not handed in and approved by the deadline set by the lecturer, the prerequisites are not met and new assignment and deadline will be set before the re-exam. Exam type: The final exam will count 100%. The final exam divided into: a. Individual oral evaluation on a mini project handed in before deadline (50%) b. Additional question from draw on the spot (50%) Internal censor Tools allowed: All Re-exam: As ordinary
ME-ENE1	Renewable energy	5	The student will acquire knowledge in, – Energy savings	Analyse the consumption of town or building and evaluate possible energy savings. Calculate the energy produc-	The student will be able to communicate with students, engineers and companies about renewable energy and	Requirements for attending examination Course assignments account for 40 % of final grade; it is divided into 20% for 2

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
			– Thermal solar heating and simulating of energy storage systems using TRNSYS 17 – Other thermal energy system (Packed-bed storage, storage wall and phase change energy storage) – Biomass and biogas – District heating and district heating network – Geothermal energy Renewable energy management (e.g. tax structures, costs for energy production, cost analyses, environmental issues)	tion from renewable sources with the integration of various energy storage scenarios. Calculate the eventually needs for supplementary fossil fuel production and the saving of CO2 emission.	outline proposals for renewable energy supply.	assignments and 20% for 1 mini project. The final exam will count 60%. The final exam divided into: a. Oral evaluation on the mini project (30%) b. Additional question from draw on the spot (30%) Type of examination: Individual oral examination - 25 minutes - based upon a subject found by draw and mini project discussion. Censor: Internal Allowed tools: None Re-examination: Course assignments account for 40 % of final grade while the final re-exam count 60%. The students might asked to do new mini project if required, improve the already submitted one or keep it without improvement.
ME-RMS1 (en-rollment 2020)	Robotics and Multibody Systems	5	The student can explain the structure of robots, mechanisms, multi body systems and manipulators. In addi-tion, the student can express kinematics, kinetics, and dynamics for robot systems. Robots: • Spatial descriptions of robots, mechanisms and manipulators	The student can design a manipulator (for example a special designed robot for industry and laboratories) and analyze the dynamics (positions, velocities, accelerations, forces and torques in time domain). The student can write simple programs for a robot. The student can analyze a closed	The student can analyze a commercial robot and design and construct a "home-made" robot or mechanism on sketch level.	Requirements for attending examination None Type of examination Individual oral examination - 20 minutes - without preparation. Examinations account for 100 % of final grade

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
			• Coordinate transformation and transform arithmetic • Forward manipulator kinematics (position, velocity and accelerations) and inverse manipulator kine-matics • Manipulator kinetics (forces and torques) • Planning robotic motion • Calculation of motion, forces, torques for robots with MathCAD and simulation with MatLab. • Programming of robots Multi Body: • Mechanism definition and structure. • Frames, body orientation, generalized coordinates, geometric constraints and driving constraints. • Kinematical analysis (position, velocity and acceleration) • Kinetic analysis, mass and inertia, applied forces • Forward and inverse dynamics • Multi Body programs (for example in MatLab) Machine vision • Structure of machine vision system • Applications of machine vision	mechanism (multi body system) with respect to motion, forces and torques. In addition, the student can apply Multi Body analysis software. The student can decide, if and how a vision system must be applied.		Censor: Internal Allowed tools None Re-examination As the ordinary examination

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
			• Image enhancement, segmentation and feature extraction • Image recognition			
ME-SMC1	System dynamics, Simulation and Control	5	Formulation of system equations for technical systems (mechanical, electromechanical, hydraulic, pneumatic and thermal systems) • Solution of linear differential equations, using Laplace transformations • Application of transform concepts to engineering systems (transients and frequency response) • Analysis of systems using Laplace transform and simulation • Numeric methods for simulation (using for example MatLab) • Simulation of engineering systems using Simulink. • Planning and interpretation of simulation • Logic control • Specification of on-off control, using Grafcet diagrammes • PLC programming	The student can formulate models of technical (mechanical, electromechanical, hydraulic, pneumatic or thermal) systems, analyze the static and dynamic behavior in time do-main and frequency domain, and simulate with MatLab / Simulink. The student understands hardware in on-off control systems and can specify the operation of the system. Further, the student can develop the control for a system, including system operation and safety.	The student can develop and analyze dynamic Mechatronic models. The student can design a complete on-off control for a machine, using typically a PLC as controller.	Requirements for attending examination - Course assignments for examination (30 hours) Type of examination Individual oral examination without preparation based upon course assignment(s) Examinations account for 100 % of final grade Censor: Internal Allowed tools Course literature according to the course description, Personal notes, Laptop, Calculator Re-examination As the ordinary examination
ME-TMT1	Thermoplastic Materials and Technologies	5	The student must gain knowledge about: Polymeric materials: o Definitions o Types o Properties o Data sheets. Technologies: o Injection moulding	After the course, the student must be able to: - Select polymers according to their physical and chemical characteristics, for either producing new products or replacing products made of other materials. - Design polymer products according to specific rules related to the relevant technologies.	Upon completing the course, the student is expected to participate in development tasks covering evaluation, design, and improvement of polymeric products, having in mind economically feasible technologies, tooling, and sustainability. Furthermore, the student should be capable of seeking, validating, and implementing additional knowledge within the subject by own hand.	Requirements for attending examination Course assignment handed in before deadline. Type of examination: Oral group presentation of the course assignment (approx. 10 minutes) followed by an individual examination (approx. 15 minutes per student) with the presence of the whole group.

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
			o Extrusion o Thermoforming o Surface treatments o Joining methods o Other technologies. Design methods and rules regarding relevant technologies. Injection moulding tools: o Design o Materials o Manufacturing o Functions. Sustainability o Recycling o Circular economy o Biodegradability.	- Select relevant technologies with respect to function, economy, and sustainability. - Understand the function of, and design simple injection moulding tools. - Estimate the cost of injection moulded products. - Evaluate a product's sustainability.		Two tests during the course account for 30%, final exam for 70%. Internal examiner. Allowed tools: All Re-examination: Same form as ordinary exam and accounting for 100% of the grade (course tests not taken into account).
ME-ELE1	Electrical Engi- nee- ring	5	After the course, the student can ex- pound: • Simple DC and AC circuits (com- plex impedance, current and volt- age, phasor analysis, load reduction and complex power) • Single and three phase AC sys- tems • Single phased transformers • Three phase systems and the power grid, power in balanced sys- tems • DC motors, types and speed con- trol • AC motors:	After the course, the student has acquired skills in: • Analysis of DC and AC systems included in mechanical system Loads Analysis	The student has acquired compe- tence in selecting and dimensioning the electrical part of mechanical drivelines.	Requirements for attending exami- na-tion None Type of examination: Individual oral examination where the student must explain how to solve a given problem. The problems are known in advance Individual oral exam based on solving a problem found by drawing lots. The duration is approx. 20 minutes. No preparation time for the exam. The exam papers are handed out at least one week before the exam. The exam counts 100% of the final grade.

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
			o Construction, temperature and iso- lation classes, thermal protec- tion,			
ME-MEC1	Mechanics 1	5	The student will acquire knowledge of basic statics in the following subjects: - Force systems, forces, mo- ments, - couples and resultants. - Method of joints and method of sections applied to flat grids and cal culation of forces in frames and ma- chines. - Distributed loads, area cen- ters, external loads on beams, internal forces in beams. - Diagrams for normal force, shear force and bending moment. - Relationships between load, shear force and bend- ing moment. - As well as knowledge at an intro- duction level of the following topics: - Strength values of materi- als, cross- section con- stants using tables. - Normal stress, shear stress, Von Misses stress and allowable stress. - Friction, friction types, dry friction	Following completion of the course the student will be able to: - Set up a free body diagram and set up static equilibrium equations. - Calculate reactions and determine internal forces in simple structures that are static determinate. - Dimension and design simple structures and select materials based on material strength values	The student will gain competence to de- sign simple mechanical equip ment and be able to participate in projects relating to simple design and dimensioning tasks.	Requirements for attending examina- tion: None Type of examination: Individual oral examination, based upon solving an assignment found by draw. The duration is app. 20 minutes No preparation time at the examination. The examination assignments are handed out at least one week before the exam. Examination counts for 100% of the fi- nal grade Internal examiner. Allowed tools: None, however books from the course will be available at the examination room. Re-examination: As ordinary

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
ME-MEC2	Mechanics 2	5	The student will acquire knowledge in methods of analysis and calculation within mechanics in the following subjects: - Stresses and strains in materials. - Plane stress with the Mohr diagram, combined load. - Static failure theories. - Deflection of beams, statically in- determinate structures. - Buckling of columns.	Following completion of the course the student will be able to, - Calculate stresses and strains in materials from axial load, torsional load, bending, and transverse shear. - Analyses of plane stresses from combined loads of a structure by calculation and by use of Mohr diagram. - Dimensioning static loaded machine components and determine the safety factor against static failure - Calculate deflections of beams by integrating the elastic line equation and by use of superposition and standard figures.	The student will gain competence to analyze, evaluate and document a mechanical design in relation to its strength. In addition, the student will have the competence to self-expand his knowledge and skills in mechanics.	Requirements for attending exam: Tests in laboratory including a report of app. 3-4 pages accomplished and accepted. The work must be done in groups of app. four students. The workload is app. 6 hours per student. Type of examination: Individual oral examination, based upon solving an assignment found by draw. The duration is app. 20 minutes. No preparation time at the examination. The examination assignments are handed out at least one week before the exam. Examination counts for 100% of the final grade. External examiner
ME-MEM1	Machine elements and design of machines	5	The student will gain knowledge of machine elements and machine design to be able to: - Explain the theoretical calculation basis for dimensioning of shafts as well as bolted and welded joints. - Explain principles of gears, torque conversion and power loss in mechanical transmissions. - Explain the parameters that form the basis for dimensioning and selection of machine elements such as screws, bearings, shaft / hub connections, couplings, clutches,gears, belts and chains in a machine construction.	The student who completes the course acquires skills in: - Analyze loads, simplify and decide calculation models for dimensioning of machines and machine elements. - Calculate, dimension and design shafts, including determining safety against yielding and fatigue. - Calculate, dimension and design simple bolt and weld joints. - Dimension, select and implement suitable standard machine elements such as bearings, bearings, shaft / hub connections, couplings, clutches, gears, belts and chains for a machine construction. - Prepare layout drawing and drawing documentation using geometric tolerances and	After the course, the student must be able to: - Set up possible solutions for the design of machine systems, based on specific requirements / criteria and assess which solutions are best suited. Including choosing solutions that ensure minimal environmental impact. - Find the necessary knowledge in catalogs and technical literature regarding machine elements/components as well as interpret and apply this knowledge in connection with machine design. - In addition, the student will have the competence to develop his or her own knowledge and skills in machine design.	Prerequisites for exam: None Exam type: Oral group exam without preparation based on a course assignment handed in before deadline. Duration for 2 students approx. 30 min. incl. 5 minute group presentation. Incl. assessment. Exam counts 100% of the final grade. Internal censor Tools allowed: All Re-exam: As ordinary

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
			- Identify and explain the working principles and technical solutions for designing machines.	standard components in CAD. - Use Mathcad or equivalent digital tool for calculation documentation.		
ME-TDE1	Technical Design	5	The student will acquire knowledge of the following: - Sketching of isometric views and doing simple developments - Using 3d CAD in technical drawing - Illustrating using the first quadrant method (European) - Dimensioning after known standards (DS/ISO 128, 129) - Using tolerances in relation to assemblies - Combine surface roughness with production methods - Weldment sections in relation to weld symbols - The use of geometrical tolerancing when design machine components - Structured drawing documentation (layout, assemblies, detail drawings and parts lists)	The student will acquire skills in: - Presenting technical documentation in 2D and 3D - Creating machine drawings according to DS/ISO 128/129 and using general tolerancing and fit tolerances - Define an describe machine components making sketches, drawings, assembly drawings and parts lists. - Identify and using standard parts in machine design	After completing the course, the student will be able to: - Present and sketch technical ideas - Construct a product from described criteria's - Argue technical solutions in a dialog with suppliers - Produce technical documentation for production - Understand production preparation of raw materials and have a dialog about production methods	Prerequisites for exam: All 13 mandatory assignments must be approved by the teacher. Exam type: Individual oral exam without preparation based on the course assignment handed in before deadline and uploaded to Wiseflow. •Duration is 20 minutes •The exam counts for 100% of the final grade •Internal censor Tools allowed: All Re-exam: Same as ordinary
ME-TER1	Thermodynamics	5	Describe, construct and interpret a thermodynamic system. Apply and understand the main laws and fundamental concepts of thermodynamics. Calculate and depict processes for ideal gas and water vapour. Apply elementary flow theory for calculations and dimension of pipe systems and pumps.	Analyse a thermodynamic system and select relevant theory in order to enable the student to calculate variables and main capacities for the system. Use the thermodynamic calculation as basis of calculation of geometric dimensions for the system or selection of components. Use EES software for thermodynamic calculations	The student will be able to identify energy aspects in mechanical projects and solve simple thermodynamic problems and/or communicate with engineers and companies about energy aspects.	Prerequisites for exam: Mandatory assignments. If the assignment is not handed in and approved by the deadline set by the lecturer, the prerequisites for entering the exam are not met. A new assignment and deadline will be set before the re-exam. Exam type:

Code	Title	ECTS	Knowledge	Skills	Competencies	Examination
			Calculate and dimension heat exchangers/heat transmission. Calculate main data for plants that use water vapour for production of power and heat.			Written 4 hours, Digitally submission The final exam counts 100% External censor Tools allowed: All Re-exam: As ordinary Final examinations counts for 100 % of final grade
ME-MMT1	Materials and Technologies	5	After completing the course, the student will be able to: • Explain metals' mechanical properties • Explain the increase of strength in metals • Explain the relation between deformation, stress and fracture in tension loaded materials • Explain materials' failure • Explain forging • Explain assembly and fastening • Explain machining • Explain fast prototyping • Explain cost price and calculation • Explain greenhouse effect • Explain circular economy and the sustainable circles • Explain and make a simple life cycle analysis • Explain United Nations Sustainable Goals • Use Edupack program	After completing the course, the student will gain skills in: • Select an appropriate type of steel for manufacturing of components. • Select an appropriate strength increasing method. • Perform common tests for materials. • Select suitable technological processes based on production volume, geometry, surface requirements, tolerance requirements, load situation, etc. in relation to environmental impact and the sustainable principles. • Explain the function of different types of production equipment. • Estimate the cost price of products. • Perform a simple life cycle analysis of a product. • Use Edupack program for selection of materials and technologies	After the course, the student must be able to: • Select suitable materials and design components based on their mechanical properties as well as their manufacturing and machining technologies in relation to the sustainability principles. • Furthermore, the student must be able to independently apply, assess, and acquire new knowledge within the subject.	Prerequisites for exam: The laboratory report must be submitted on time and must be approved by the lecturer. Exam type: Individual oral exam, without preparation. Duration approx. 25 minutes Exam counts 100% of the final grade Internal co-examiner Weighting: The material part and the technology part each weigh 50% of the total grade. Tools allowed: All Re-exam: As the ordinary exam