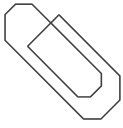


Unfold your talent
VIA University College



Curriculum Programme

**Bachelor of Engineering
in
Global Business Engineering**

**For students enrolled
August 2017 and after**

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Introduction

In accordance with the Professional Bachelor's Degree Programme, the purpose of the Bachelor of Engineering in Global Business Engineering programme is to qualify students to carry out the following business functions in a national or an international context:

- Apply research, theory, tools and methods from natural science, engineering and the fields of business and communication to conceive, design and implement solutions to practical engineering problems.
- Critically acquire new knowledge within relevant engineering areas
- Independently solve common engineering tasks
- Participate in collaborative and managerial functions and contexts at a qualified level with people of different educational, linguistic and cultural backgrounds

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

VIA Engineering endeavors to work in accordance with a common DNA for all engineering courses. The DNA contains a description of what especially characterizes the engineering programmes at VIA, as well as what to expect from a graduate from our engineering programmes

At VIA Engineering, we are practice and project oriented and focus on the surrounding world. These objectives are achieved through relevant teaching, research and development as well as cooperation and ongoing dialogue with the business community. The programmes at VIA Engineering will qualify the graduates to perform practice- and development-oriented business functions.

English-language programmes and international admission is a characteristic of our engineering programmes. This profile creates a unique opportunity to educate students who can act in a Danish context on an increasingly global market. Our lecturers have a broad practical experience, and they understand how to combine theory and practice through laboratory work, company visits and projects for and in collaboration with companies.

To ensure the usefulness of the content of the programme, the principles of the CDIO education concept are applied, ensuring that the individual courses are continuously reviewed, evaluated and developed.

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 international focus and the inter-disciplinary skills, which will make the GBE graduate attractive to a wide range of companies.

The study location is either Horsens or Aarhus (1st-4th semester), however all courses from the 5th semester are taught in Horsens.

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

2. Structure and content

The programme is organised as a full-time higher education. Science and technology make up about two-thirds of the study programme. Business and language courses make up the last third 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 following two tables for GBE-Mechanical Engineering and GBE-Software Engineering, respectively.

GBE-Mechanical Engineering Specialisation

Semester	Course	Course	Course	Course/ Project	Project	
9 th semester	Elective course	Elective course	BPR2 Bachelor Project			
8 th semester Internship	INP1 Internship					
7 th semester	ME MDE1 Machine Design	ME ELE1 Electrical Engineering	MST1 Management & Strategy	SEP7 Semester Project		
6 th semester Study abroad	ME MEC2 Mechanics	ME MED1 Machine Element Design	ME TER 1 Thermo- dynamics	Elective course ME-engineering	Elective course	Elective course
5 th semester	ME TEM1 Technology and Environment	ME MTR1 Materials Science	ME TDE1 Technical Design	LANG3 German/ French/ Spanish/ Danish	SEP5 Semester Project	
4 th semester	ME DYN1 Dynamics	ENB M2 Electronics, Thermo- dynamics	LANG2 German/ French/ Spanish/ Danish	FCM1 Financial Management	INO1 Cross Disciplinary Innovation	SEP4 Semester Project
3 rd semester	ME MEC1 Statics	MAT3 Mathematics 3	LANG1 German/ French/ Spanish/ Danish	BUE1 Business Economics	SEP3 Semester Project	
2 nd semester	ENB M1 Introduction to Mechanical Engineering	MAT2 Mathematics 2	GBC2 Global Business Communication 2	MAM2 Marketing Management 2	IBC1 Intercultural Business Communica- tion	SEP2 Semester Project
1 st semester	ENB ICT1 Introduction to Software Engineering	MAT1 Mathematics 1	GBC1 Global Business Communication 1	MAM1 Marketing Management 1	SSE1 Study Skills for Engineering Students	SEP1 Semester Project

GBE-Software Engineering Specialisation

Semester	Course	Course	Course	Course/ Project	Project	
9 th semester	Elective course	Elective course	BPR2 Bachelor Project			
8 th semester Internship	INP1 Internship					
7 th semester	IT DNP1 .NET Programming	IT ERP1 ERP systems SAP ABAP/4 programming	MST1 Management & Strategy	SPE7 Semester Project		
6 th semester Study abroad	IT WEE1 Web Engineering Processes	IT BUI1 Business intelligence	IT AND1 Android development	Elective course Software Engineering	Elective course	Elective course
5 th semester	IT SWE1 Software Engineering	IT SDJ2 Software development with Java 2		LANG 3 German/ French/ Spanish/ Danish	SEP5 Semester Project	
4 th semester	IT DBS1 Database Systems	IT RWD1 Responsive web design	LANG 2 German/ French/ Spanish/ Danish	FCM1 Financial Management	INO1 Cross Disciplinary Innovation	SEP4 Semester Project
3 rd semester	IT SDJ1 Software development with Java 1		LANG 1 German/ French/ Spanish/ Danish	BUE1 Business Economics	SEP3 Semester Project	
2 nd semester	ENB M1 Introduction to Mechanical Engineering	MAT2 Mathematics 2	GBC2 Global Business Communication 2	MAM2 Marketing Management 2	IBC1 Intercultural Business Communica- tion	SEP2 Semester Project
1 st semester	ENB ICT1 Introduction to Software Engineering	MAT1 Mathematics 1	GBC1 Global Business Communication 1	MAM1 Marketing Management 1	SSE1 Study Skills for Engineering Students	SEP1 Semester Project

The planned duration of the programme is 4 ½ years divided into 9 semesters and a total of 270 ECTS credit points. A single ECTS point represents 27.5 hours of study activity.

Each year the student will be able to complete study activities corresponding to 60 ECTS points. Study activities are,

- Mandatory courses and projects
- Internship
- Elective courses
- Bachelor project

All mandatory and elective courses will be either 5 or 10 ECTS. Projects range from 5 to 20 ECTS. The content, learning objectives, evaluation methods and tests of each course are described in this curriculum. A more detailed description of each course is available online.

3. Compulsory elements of the programme

All courses in the first five semesters are compulsory, and most of the courses are included in a semester project. The overall purpose of the semester projects is to tie the courses together and thereby combine science, languages & culture and business, which is the main advantage of the GBE programme. Project methods, philosophy of science, research methods, teamwork, and documentation skills are taught in the context of the semester projects.

Each semester has a theme. Knowledge and skills are acquired through the course work. Competences are acquired through the project work. The themes of the five semesters are:

- 1st semester: Robotics
- 2nd semester: Design and Technology
- 3rd semester: International Business Environment
- 4th semester: Sustainable Energy
- 5th semester: Innovative Product Development

After completion of the 2nd semester, the GBE-student must choose either a mechanical engineering specialisation or a software engineering specialisation – therefore the engineering courses from the 3rd to the 9th semester of the GBE programme will be either mechanical engineering courses or software engineering courses (see 2. *Structure and content* for more details of the GBE-Mechanical engineering specialisation programme and the GBE-Software engineering specialisation programme).

3.1 1st semester: Robotics

Content

- Introduction to software engineering (ENB ICT1)
- Mathematics 1 (MAT1)
- Global Business Communication1 (GBC1)
- Marketing Management 1 (MAM1)
- Study Skills for Engineering Students (SSE1)
- Semester Project (SEP1)

Learning objectives

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 study programme. More specifically for the first semester, the students must demonstrate their ability to design a robotic software solution including a marketing plan.

Knowledge

- ENB: The student will gain knowledge of basic computer hardware architecture and basic computer software architecture.
- MAT: The student will obtain knowledge within basic areas of mathematics, algebra, 2D and 3D vectors, trigonometry and geometry.
- GBC: The student should acquire knowledge about the international business environment, communication models, professional writing and presentation in English.
- MAM: The student will obtain wide knowledge on marketing management in order to be able to design a marketing plan using relevant theories and models to identify, design and choose between alternative operative, tactic and strategic possibilities.

Skills

- ENB: Design and describe an IT system, including using Activity Diagrams. Solving simple physical challenges by programming a robot.
- MAT: Solve simple mathematical problems within the areas of algebra, 2D and 3D vectors, trigonometry and geometry.
- GBC: Analyse a communication situation and communicate precisely and with a varied vocabulary in English, orally as well as in writing. Read and understand linguistically complex texts in English as well as apply relevant terminology within business and technical subjects.
- MAM: Choose relevant marketing theories and models in a given context, moreover identify and evaluate marketing strategies. Perform segmentation, macro analysis, competitor analysis, and customer analysis regarding need, wants and buying behaviour in the B2C and B2B market. Design a marketing mix in line with situation analysis, target group and chosen strategies.

Competences

- ENB: Be able to understand the world of IT programming.
- MAT: Use mathematical theory to solve simple mathematical problems within the areas of Algebra, 2D and 3D vectors, Trigonometry and Geometry.
- GBC: Apply 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. Furthermore, the student should be able to critically acquire new knowledge within relevant engineering areas.
- MAM: Use basic marketing management theories and models and make a structured situational analysis of a company and its marketing environment.

Volume

30 ECTS credits

Exams

Introduction to Software Engineering (ENB ICT1)	5 ECTS	Oral
Mathematics 1 (MAT1)	5 ECTS	Written
Global Business Communication1 (GBC1)	5 ECTS	Oral and written
Marketing Management 1 (MAM1)	5 ECTS	Oral and written
Study Skills for Engineering Students (SSE1)	5 ECTS	Passed/not passed
Semester Project (SEP1)	5 ECTS	Oral and written

3.2 2nd semester: Design & Technology

Content

- Introduction to Mechanical Engineering (ENBM1)
- Mathematics 2 (MAT2)
- Global Business Communication 2 (GBC2)
- Marketing Management (MAM2)
- Intercultural Business Communication (IBC1)
- Semester Project (SEP2)

Learning objectives

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 study programme. More specifically for the second semester, the students must demonstrate their ability to design a 3D technical mechanical solution including an international marketing plan.

Knowledge

- ENB: The student will acquire knowledge about the SI unit system, kinematics (velocity and acceleration in 1D and 2D, projectile motion), and dynamics (Newton's Laws, work, kinetic and potential energy, conservation of mechanical energy, friction, springs).
- MAT: The student will be able to solve simple mathematical problems within the areas of functions (trigonometric, exponential, logarithm), differentiation, optimization, integration, vector valued functions in 2D.
- GBC: The student will be able to identify requirements to project writing in English, describe different aspects of the semester theme and account for the conventions of technical writing in English.
- MAM: The student will acquire knowledge about global marketing strategies, the complete range of market entry methods, internationalization strategies for small and large companies, and the challenges related to the internationalization process.
- IBC1: The student will acquire knowledge about the basic structures, elements and functions of culture; cultural value dimensions; verbal, non-verbal and written intercultural communication; the importance of culture and intercultural communication in international business as well as intercultural management, leadership, teamwork, negotiations, ethics and conflicts.

Skills

- ENB: Be able to correctly use the SI-unit system and perform dimensional checks of calculations and, moreover, analyse and solve simple problems within kinematics and dynamics.

- MAT: Be able to understand and solve simple problems including functions, differentiation and integration of functions with one unknown factor, and understand and solve 2D vector valued functions.
- GBC: Analyse a communication situation and communicate precisely orally as well as in writing.
Apply different academic writing requirements in terms of syntax, coherence and structure and discuss linguistically complex texts in English.
- MAM: Be able to build a market profile of a country by conducting a PEST and market analysis.
Be able to provide input to international market strategy development and critically evaluate a company's international marketing environment and its current strategy and, moreover, be able to design an international marketing mix.
Apply relevant terminology within business and technical subjects, and the conventions of technical writing in English.
- IBC1: Understand how culture affects aspects of international communication and management; acquire a better understanding of his/her own cultural conditioning; 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 as well as successfully manage cross-cultural communications.

Competences

- ENB: Gain competences in reading scientific text including formulae, graphs, diagrams etc., and applying an analytical and systematic approach to simple, stylized engineering problems, communications simple calculations using concise language, formulae, and sketches.
- MAT: Apply mathematical knowledge in solving specific problems.
- GBC: Apply selected relevant approaches when writing professional business messages and communicate effectively and professionally with a company's internal and external stakeholders from different cultural backgrounds.
- MAM: Gain competences to identify global opportunities and assess the associated risks. Developing a global marketing strategy and an international marketing plan that is aligned with the objectives of the company.
- IBC1: Identify, accept and adjust to cultural similarities and differences; adjust to culturally based differences in communication style (e.g. in negotiations and in other communication situations); find, apply and evaluate literature and information in general on cultural practice in a country or region as well as apply effective communication strategies depending on situation, context and culture

Exams

30 ECTS credits

Exams

Introduction to Mechanical Engineering (ENB M1)	5 ECTS	Written
Mathematics 2 (MAT2)	5 ECTS	Written
Global Business Communication 2 (GBC2)	5 ECTS	Written
Marketing Management (MAM2)	5 ECTS	Written
Intercultural Business Communication (IBC1)	5 ECTS	Oral
Semester Project (SEP2)	5 ECTS	Written and oral

3.3 3rd semester: International Business Environment

Content

GBE - Mechanical engineering specialisation:

- Statics 1 (ME MEC1)
- Mathematics 3 (MAT3)
- German/French/Spanish/Danish (LANG1)
- Business Economics (BUE1)
- Semester Project (SEP3)

GBE - Software engineering specialisation:

- Software Development with Java 1 (IT SDJ1)
- German/French/Spanish/Danish (LANG1)
- Business Economics (BUE1)
- Semester Project (SEP3)

Learning objectives

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 study programme. More specifically for the third semester, the students must demonstrate their ability to design a warehouse management solution and analyse the international challenges and opportunities

Knowledge

GBE - Mechanical engineering specialisation:

- MEC: The student will acquire knowledge of basic statics in the subjects of force systems, static equilibrium, free body diagrams, method of joints and method of sections applied to flat grids, and calculation of forces in frames and machines. Moreover, knowledge within distributed loads, area centers, external loads on beams, internal forces in beams, diagrams for normal force, shear force and bending moment and relationships between load, shear force and bending moment. At an introduction level, the student will also acquire knowledge within strength values of materials, cross-section constants using tables, stress, pre- calculation of static and dynamically impacted shafts and pin connections, and friction.
- MAT: The student will obtain knowledge within polar coordinates and curves, complex numbers, 1st and 2nd or- der linear differential equations and linear algebra.
- LANG: The student will obtain knowledge about, understand and reflect on the French/German/Spanish/Danish language, including syntax, phonetics, grammar, and semantics historical, social, cultural, and political conditions in the French/German/Spanish/Danish-speaking areas.
- BUE: The student is introduced to both micro- and macroeconomic tools to help analyse firm demand and supply, firm profit maximization, and aggregate (market) demand and supply.

GBE - Software engineering specialisation:

- SDJ: The student should be able to understand Java programming constructs, basic types in Java and their applicability, the role of fields, methods, constructors, and references in Java programming, and the relation- ship between array, array length, indices and elements in Java. Moreover, the student will acquire knowledge of the elements of UML class diagrams, activity diagrams and sequence diagrams.
- LANG: The student will obtain knowledge about, understand and reflect on the French/German/Spanish/Danish language, including syntax, phonetics, grammar, and semantics historical, social, cultural, and political conditions in the French/German/Spanish/Danish-speaking areas.
- BUE: The student is introduced to both micro- and macroeconomic tools to help analyse firm demand and supply, firm profit maximization, and aggregate (market) demand and supply.

Skills

GBE - Mechanical engineering specialisation:

- MEC: 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. Moreover, the student will be able to dimension and design simple structures and select materials based on material strength values.
- MAT: The student will be able to use topics from the infinitesimal calculus dealing with functions of one variable and identify and solve chosen differential equation of first and second order. In addition to this, the student will be able to describe polar coordinates and their curves and describe and use complex numbers. Apply techniques and results from linear algebra to solve problems in linear systems, matrices.
- LANG: The student will be able to communicate reasonably well in French/German/Spanish/Danish, understand spoken French/German/Spanish/Danish (read, understand and discuss authentic texts about cultural, social or political issues and make presentations on cultural, social or political issues), and write simple texts in French/German/Spanish/Danish.
- BUE: At the end of the semester, the student should be able to use appropriate tools to model the company and market situation, define and describe how firms' behaviour differs in different market structures and may help to determine those structures, and define and describe how firms determine price and quantity supplied on the market. Moreover, the student will be able to analyze and assess efficiency and welfare optimality of perfectly and imperfectly competitive markets and analyse and assess the effects of externalities and public goods on efficiency.

GBE - Software engineering specialisation:

- SDJ: The student should achieve skills within creating and using objects in Java, implementing programs in Java (with fields, constructors and methods, inheritance, association, aggregation and composition, Arrays and Array Lists, file IO persistence, exceptions, simple GUI's) and using best practices for writing and documenting Java source code.
- LANG: The student will be able to communicate reasonably well in French/German/Spanish/Danish, understand spoken French/German/Spanish/Danish (read, understand and discuss authentic texts about cultural, social or political issues and make presentations on cultural, social or political issues), and write simple texts in French/German/Spanish/Danish.
- BUE: At the end of the semester, the student should be able to use appropriate tools to model the company and market situation, define and describe how firms' behaviour differs in different market structures and may help to determine those structures, and define and describe how firms determine price and quantity supplied on the market. Moreover, the student will be able to analyze and assess efficiency and welfare optimality of perfectly and imperfectly competitive markets and analyse and assess the effects of externalities and public goods on efficiency.

Competences

GBE - Mechanical engineering specialisation:

- MEC: The student will gain competence to design simple mechanical equipment and be able to participate in projects relating to simple design and dimensioning tasks.
- MAT: The student will also be able to set up and use mathematical models on given problems, apply linear algebra to the study of various phenomena in engineering science and use matrices to solve concrete problems.
- LANG: The student should to a certain extent, be able to communicate in a clear French/German/Spanish/Danish language, orally and in writing, in an international context. Moreover, the student must be able to function and cooperate with people with different educational, language, and cultural backgrounds, and structure own learning in an effective way and critically acquire new knowledge within relevant engineering areas.
- BUE: After completing the semester, the students should be able 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. Moreover, the students should be able to use the most important theories from "Macroeconomics" to obtain knowledge on the global macro economy and find, criticise and use relevant data on macroeconomics from the Internet for a relevant country.

GBE - Software engineering specialisation:

- SDJ: The student should be able to master and use the basic object-oriented concepts, including relationships, collaboration and poly-morphism. The student will moreover gain competence in implementation of smaller programmes in Java including embedded programming and implementation of smaller systems from a UML design.
- LANG: The student should to a certain extent, be able to communicate in a clear French/German/Spanish/Danish language, orally and in writing, in an international context. Moreover, the student must be able to function and cooperate with people with different educational, language and cultural backgrounds, and structure own learning in an effective way and critically acquire new knowledge within relevant engineering areas.
- BUE: After completing the semester, the students should be able 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. Moreover, the students should be able to use the most important theories from "Macroeconomics" to obtain knowledge on the global macro economy and find, criticize and use relevant data on macroeconomics from the Internet for a relevant country.

Volume

30 ECTS credits

Exams

Software Development with Java 1 (IT SDJ1)	10 ECTS	Oral
Statistics 1 (ME MEC1)	5 ECTS	Oral
Mathematics 3 (ME MAT3)	5 ECTS	Written
Business Economics (BUE1)	5 ECTS	Oral and written
German/French/Spanish/Danish (LANG1)	5 ECTS	Oral
Semester Project (SEP3)	10 ECTS	Oral and written

3.4 4th semester: Sustainable Energy

Content

GBE - Mechanical engineering specialisation:

- Dynamics (ME DYN1)
- Electronics, Thermodynamics (ENB M2)
- German/French/Spanish/Danish (LANG2)
- Financial Management (FCM1)
- Cross Disciplinary Innovation (INO1)
- Semester Project (SEP4)

GBE - Software engineering specialisation:

- Database Systems (IT DBS1)
- Responsive Web Design (IT RWD1)
- German/French/Spanish/Danish (LANG2)
- Financial Management (FCM1)
- Cross Disciplinary Innovation (INO1)
- Semester Project (SEP4)

Learning objectives

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 study programme. More specifically for the fourth semester, the students must demonstrate their ability to design a sustainable and profitable energy solution.

Knowledge

GBE - Mechanical engineering specialisation:

- DYN: Knowledge about the kinematics of particle motion, force and acceleration for particles, principle of linear impulse and momentum for particles, mechanical energy, and basic theory of fixed axis rotation for rigid bodies.
- ENB: Knowledge about 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
- LANG: Basic grammar, sentence structure, vocabulary and pronunciation. Knowledge about business and industry in relevant countries.
- FCM: Upon successful completion of this course, the student will be able to understand how companies makes decision regarding risk, investments, financing and other wealth creating processes that companies go through.
- INO: An understanding of innovation and its uses within the field of engineering. Knowledge of Design Thinking (double diamond) and how to create a systematic and measurable progress in innovation tasks.

GBE - Software engineering specialisation:

- DBS: The students will obtain theoretical knowledge on designing relational databases for practical application using a theoretical data modelling methodology. Students will obtain theoretical knowledge about relational algebra, UML notation for databases, E/R models, relational models, SQL, normalization, transaction handling and concurrency control.
- RWD: The student will gain knowledge within HTML5, CSS3, W3C Validation, Responsive web- Design (Multiplatform), jQuery, and Bootstrap.
- LANG: Basic grammar, sentence structure, vocabulary and pronunciation. Knowledge about business and industry in relevant countries.
- FCM: Upon successful completion of this course, the student will be able to understand how companies makes decision regarding risk, investments, financing and other wealth creating processes that companies go through.
- INO: An understanding of innovation and its uses within the field of engineering. Knowledge of Design Thinking (double diamond) and how to create a systematic and measurable progress in innovation tasks.

Skills

GBE - Mechanical engineering specialisation:

- DYN: The students will apply kinematic relations to the description of particle motion, perform absolute dependent motion analysis, account for the forces acting on a particle and draw a proper free-body diagram, and solve the equations of motion for particles and for simple systems of particles. Moreover, the students will be able to describe the concepts of kinetic energy, work and potential energy and apply these to particle dynamics problems.
- ENB: the students will be able to solve simple exercises in electrostatics, exercises related to DC circuits, and exercises in thermodynamics.
- LANG: Use relevant business terminology. Read and understand authentic texts on issues relating to business and industry. Find, use, and discuss information in French/German/Spanish/Danish on business subjects. Make presentations in French/German/Spanish/Danish on various subjects. Prepare simple texts with special focus on the global business engineer's professional area
- FCM: Analyzing and interpreting accounting information in a communication context. Analyzing and interpreting capital investment applications
- INO: Engage in innovative processes in a Cross-/inter-/multidisciplinary setting. Conceive, plan, and execute innovative ideas and work methodically with innovation.

GBE - Software engineering specialisation:

- DBS: Having completed this semester, students will be able to create ER-Models with UML, understand and explain the relational model, use Data Definition Language (DDL) to create databases, use Data Manipulation Language (DML) to manipulate data in a database, map ER-Models to Relational Models, use basic SQL statements to create, replace, update and delete data in a database, understand and use keys in relational databases, understand and use joins, and handle the process of normalization to 3NF.
- RWD: the students will be able to create web sites using Hyper Text Markup Language (HTML5), style web pages using Cascading Style Sheets (CSS3), using responsive web-Design to design web sites that are platform independent, and create "smart" web sites using jQuery, and Bootstrap.
- LANG: Use relevant business terminology. Read and understand authentic texts on issues relating to business and industry. Find, use, and discuss information in French/German/Spanish/Danish on business subjects. Make presentations in French/German/Spanish/Danish on various subjects. Prepare simple texts with special focus on the global business engineer's professional area
- FCM: Analyzing and interpreting accounting information in a communication context. Analyzing and interpreting capital investment applications
- INO: Engage in innovative processes in a Cross-/inter-/multidisciplinary setting. Conceive, plan, and execute innovative ideas and work methodically with innovation.

Competences

GBE - Mechanical engineering specialisation:

- DYN: Identification of which parts of the acquired knowledge and skills that are relevant to a given, simple real-world mechanical problem. Furthermore, the students can model real-world problems using the acquired knowledge and skills and expand her/his knowledge on dynamics in more advanced courses.
- ENB: The students must also achieve competences within basic understanding of electrostatics, basic understanding of circuit theory, and basic understanding of thermodynamics.
- LANG: Communicate in a clear French/German/Spanish/Danish language orally and in writing in an international context. Function and cooperate with people with different educational, language, and cultural background. Put knowledge of the language and the foreign society as well as the French/German/Spanish/Danish speaking countries into practice in an international context.
- FCM: Evaluate capital investment proposals. Play a role as a constructive sparring partner for the company's employees who are responsible for the strategic corporate investments and financing. Make calculations of the return of an investment, break-even – and probability analysis of a proposed investment scenario
- INO: Introducing innovative ideas into project work. Clarifying multidisciplinary group competencies. Contributing own professional skills in teams with the objective of solving problems by using innovative processes and models.

GBE - Software engineering specialisation:

- DBS: Having completed this semester, the students will be able to create database-based applications using industry standard tools and methods, and obtain the fundamental knowledge, which is needed to create platform independent web applications.
- RWD: Create platform independent web applications.
- LANG: Communicate in a clear French/German/Spanish/Danish language orally and in writing in an international context. Function and cooperate with people with different educational, language, and cultural background. Put knowledge of the language and the foreign society as well as the French/German/Spanish/Danish speaking countries into practice in an international context.
- FCM: Evaluate capital investment proposals. Play a role as a constructive sparring partner for the company's employees who are responsible for the strategic corporate investments and financing. Make

calculations of the return of an investment, break-even – and probability analysis of a proposed investment scenario

- INO: Introducing innovative ideas into project work. Clarifying multidisciplinary group competencies. Contributing own professional skills in teams with the objective of solving problems by using innovative processes and models.

Volume

30 ECTS credits

Exams

Dynamics (ME DYN1)	5 ECTS	Written
Electronics, Thermodynamics (ENB M2)	5 ECTS	Written
Database Systems (IT DBS1)	5 ECTS	Oral
Responsive Web Design (IT RWD1)	5 ECTS	Written
German/French/Spanish/Danish (LANG2)	5 ECTS	Oral
Financial Management (FCM1)	5 ECTS	Written
Cross Disciplinary Innovation (INO1)	5 ECTS	Passed/not passed
Semester Project (SEP4)	5 ECTS	Written and oral

3.5 5th semester: Innovative Product Development

Content

GBE - Mechanical engineering specialisation:

- Technology (ME TEM1)
- Material Science (ME MTR1)
- Construction (ME TDE1)
- German/French/Spanish/Danish (LANG3)
- Semester Project (SEP5)

GBE - Software engineering specialisation:

- Software Engineering 1 (IT SWE1)
- Software Development with Java (IT SDJ2)
- German/French/Spanish/Danish (LANG3)
- Semester Project (SEP5)

Learning objectives

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 study programme. More specifically for the fifth semester, the students must demonstrate their ability to design and develop an innovative product solution for the international market.

Knowledge

GBE - Mechanical engineering specialisation:

- TEM: Bulk deformation. Sheet metal forming. Joining and fastening. Material removal. Metal casting. Powder metallurgy. Design for manufacturing including choice of processes and cost calculations. Simple life cycle analysis of products.
- MTR: Steel, cast iron, stainless steel, titanium, aluminium, and polymers. Heat treatments. Deformation, stress and fracture in tension loaded materials. Corrosion and degradation.

- TDE: Has acquired knowledge in relevant graphic methods / techniques in the field of mechanical engineering. Keywords include: Double-angled projection, unfolding, isometric view, sketching, technical drawing fundamentals according to DS/ISO 128 and DS/ISO 129, surface characteristic, surface roughness, welding symbols, drawing structure (layout, main assembly drawing, sub-assembly drawing, detail drawing, part lists), dimensional tolerances and fits (tolerance system, choice of tolerances / fits) and selected mechanical parts.
- LANG: Basic grammar, sentence structure, vocabulary and pronunciation. Knowledge about business and industry in relevant countries.

GBE - Software engineering specialisation:

- SWE: Abstraction, UML, S.O.L.I.D Design principles, Unified Process, SCRUM, Design principles, Architecture design, Requirement capturing, Analysis vs. Design models, Understand the difference between software development and coding
- SDJ2: System architecture, Different methods for testing. Concurrency. System deployment. Design patterns. Client/server structure
- LANG: Basic grammar, sentence structure, vocabulary and pronunciation. Knowledge about business and industry in relevant countries.

Skills

GBE - Mechanical engineering specialisation:

- TEM: Select suitable technological processes based upon production volume, geometry, surface requirements, tolerance requirements, load situation etc. Account for the function of different types of production equipment. Estimate the cost price of products. Perform a life cycle analysis on a product.
- MTR: Select a suitable material among steel, cast iron, stainless steel, titanium, aluminium, and polymers, for manufacturing of components. Identify and describe a suitable heat treatment. Carry out common test methods for materials. Explain the relation between deformation, stress and fracture in tension loaded materials. Identify corrosion forms. Apply corrosion preventive measures.
- TDE: Communicate graphically in 2D and 3D. Perform technical drawings according to DS/ISO 128/129, including applying tolerances (general and fits). The hierarchy of technical drawings for mechanical engineering covering sketching, layout-, part-, sub-assembly, assembly drawings and part lists. Identify and choosing appropriate standard parts.
- LANG: read, understand and discuss texts in French/German/Spanish/Danish on social, business and engineering issues in a rather high level of accuracy. The student should be confident using appropriate terminology and do negotiations and presentations.

GBE - Software engineering specialisation:

- SWE: Analyse a problem and document the analysis and design for the solution in UML. Practical use of UML and Unified Process. Use UML to document requirements, analysis and design artefacts. Follow Unified Process in combination with agile software development. Use SCRUM together with Unified Process. Create a domain model from a problem description and requirement specification and the elements in the model. Create a design model and understand the elements within it. Use the S.O.L.I.D principles on a design model. Design for test. Create architectural design models
- SDJ2: Implement design patterns in Java. Test software using different testing techniques, including (but not limited to) JUnit testing, System testing, etc. Create jar files. Implement thread-safe classes and multi-threaded programs. Make programs communicate using client-server technologies
- LANG: read, understand and discuss texts in French/German/Spanish/Danish on social, business and engineering issues in a rather high level of accuracy. The student should be confident using appropriate terminology and do negotiations and presentations.

Competences

GBE - Mechanical engineering specialisation:

- TEM: Upon completing the course, the student must be able to participate in development tasks covering the design and/or evaluation and improvement of products, by choosing suitable technological processes. The student must be able to analyze, interpret and use a life cycle analysis having in mind economic and environmental aspects.
Furthermore, the student should be capable of seeking, validating and acquiring additional knowledge within the subject on his/her own.
- MTR: The student must be able to participate in development tasks covering the design and/or evaluation and improvement of steel, cast iron, titanium, aluminium or polymer items.
Furthermore, the student should be capable of seeking, validating and acquiring additional knowledge within the subject on his/her own.
- TDE: Design a mechanical product on basis of the stated requirements and criteria. Communicate with suppliers about technical specifications. Produce the necessary documentation for production. Communicate with Production regarding means and methods for a mechanical product
- LANG: Communicate in French/German/Spanish/Danish 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 society into practice in an international context

GBE - Software engineering specialisation:

- SWE: Work on a high abstraction level – what is the problem to solve? Understand a problem and be able to make a requirement specification with Use Cases and non-functional requirements. Cooperate in projects with many participants.
- SDJ2: Implement programs in Java using design patterns and evaluate which to use. Test software using relevant testing techniques. Develop flexible java code using interfaces. Implement thread-safe classes and multi-threaded programs. Implement client-server systems
- LANG: Communicate in French/German/Spanish/Danish 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 society into practice in an international context

Volume

30 ECTS credits

Exams

Technology (ME TEM1)	5 ECTS	Oral
Material Science (ME MTR1)	5 ECTS	Oral
Construction (ME TDE1)	5 ECTS	Passed / not passed
Software Engineering 1 (IT SWE1)	5 ECTS	Oral and written
Software Development with Java (IT SDJ2)	10 ECTS	Oral
German/French/Spanish/Danish (LANG3)	5 ECTS	Oral
Semester Project (SEP5)	10 ECTS	Oral and written

3.6 6th semester: Study Abroad

Content

GBE - Mechanical engineering specialisation:

- Mechanics (ME MEC2)
- Machine Element Design (ME MED1)
- Thermodynamics (ME TER1)

GBE - Software engineering specialisation:

- Web Engineering Processes (IT WEE1)
- Business Intelligence (IT BUI1)
- Android Development (IT AND1)

Learning objectives

During the sixth semester, the students must demonstrate their ability to study and work in a technical and international environment.

Knowledge

Pending

Skills

Pending

Competences

Pending

Volume

30 ECTS credits

Exams

Mechanics (ME MEC2)	5 ECTS	
Machine Element Design (ME MED 1)	5 ECTS	
Thermodynamics (ME TER1)	5 ECTS	
Web Engineering Processes (IT WEE1)	5 ECTS	
Business Intelligence (IT BUI1)	5 ECTS	
Android Development (IT AND1)	5 ECTS	

3.7 7th semester: Bachelor Preparation

Content

GBE - Mechanical engineering specialisation:

- Machine Design (ME MDE1)
- Electrical Engineering (ME ELE1)
- Management and Strategy (MST1)
- Semester Project (SEP7)

GBE - Software engineering specialisation:

- .NET Programming 1 (IT DNP1)
- ERP systems and SAP ABAP/4 programming (IT ERP1)
- Management and Strategy (MST1)
- Semester Project (SEP7)

Learning objectives

Pending

Knowledge

Pending

Skills

Pending

Competences

Pending

Volume

30 ECTS credits

Exams

Machine Design (ME MDE1)	5 ECTS	
Electrical Engineering (ME ELE1)	5 ECTS	
.NET Programming 1 (IT DNP1)	5 ECTS	
ERP systems SAP ABAP/4 Programming 1 (IT ERP1)	5 ECTS	
Management and Strategy (MST1)	5 ECTS	
Semester Project (SEP7)	15 ECTS	

3.8 8th semester: Internship

For further details, read section 4.

3.9 9th semester: Bachelor project

For further details on the bachelor project, read section 6.

Content

GBE - Mechanical engineering specialisation

- Bachelor Project (BRP2)

GBE - Software engineering specialisation:

- Bachelor Project (BRP2)

Bachelor Project (BPR2)	20 ECTS	Written and oral
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4. Internship

The internship comprises a semester of 30 ECTS and is placed on the 8th semester of the programme. The internship period is either paid or unpaid and takes place either in a private or in a public company in Denmark or abroad.

The purpose of the internship is for the student to acquire insight into practical engineering equivalent to the work of an engineering assistant, combined with the integrated application of the concepts, methods and techniques of the applied disciplines acquired in the first seven semesters.

The following prerequisites must be met before an internship can commence:

- All courses on the first 7 semesters must be passed / approved
- Workshops must be passed / approved or credited

The student is responsible for finding an internship position which must be approved by VIA, who will appoint a supervisor to the intern.

The student prepares a plan for the internship programme with a corresponding assignment elaborated in cooperation with the company.

The basis for an assessment of the internship is continuous reporting by the student to VIA, feedback from the internship company, as well as a presentation during which the supervisor can ask detailed questions about the internship content.

If the internship is interrupted before the end of the internship period, the supervisor must, in consultation with the head of programme, assess whether the internship has had a duration and a content sufficient for passing the internship.

The internship is assessed pass / fail.

5. Elective courses

The GBE programme comprises 25 elective ECTS points:

In the 6th and 9th semesters, students can mix elective courses from the Global Business Engineering, Software Engineering and Mechanical Engineering programmes irrespective of the chosen specialization. The electives listed below show those offered by the Global Business Engineering programme. The electives offered by the mechanical engineering and software engineering programmes do not appear from the present curriculum.

It is also possible to choose one elective from other programmes. If so, the elective must be approved by the study counsellor.

Global Business Engineering Electives

- Doing Business in the US (DBU1)
- E-commerce (ECO1)
- Entrepreneurship (ENT1)
- Market Communication (MCO1)
- Personal Selling and Sales Management (SSM1)
- Project Management (PRM1)

Course purpose

- DBU1: The purpose of this course is to give the students in-depth knowledge of factors which affect the business climate in the US. The course will develop the students' English oral proficiency and expand their vocabulary relevant to the course topics.
- ECO1: Based on an analysis of a given company and its trade, the students learn how to integrate e-commerce in a future company strategy in an expedient way. This includes knowledge about economic, logistic and organizational consequences that e-commerce can have on companies on a short and a long term. The course includes an introduction to professional requirements to an e-commerce website.
- ENT1: The purpose 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 taking action. This requires an entrepreneurial mindset, and therefore by necessity involves professionalism, personality, identity and values to make business creation genuine and distinguish it from other companies and organizations.
- MCO1: This course provides students with the theoretical and practical tools needed to understand the relation between a campaign strategy and the communicative characteristics associated with the execution of the strategy. The purpose is also to give students the tools to design basic on- and offline communication products such as advertisements, direct mails, press releases, articles as well as social media and corporate web communication messages.
- SSM1: The purpose is to enable 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.
- PRM1: During the course, the student will become familiar with the tools that can help the project manager being successful in his or her work. Focus will be on how to organize a complex cross-disciplinary project and apply relevant tool in order to minimize the risk of failure.

6. Bachelor Thesis

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

The Bachelor thesis must demonstrate individual self-critical reflection within the chosen subject as well as document the student's ability to apply engineering theories and methods. In addition, the bachelor thesis must reflect the student's ability to express himself/herself professionally and structured within his/her subject.

The prerequisites for starting the bachelor thesis are that the student has passed all courses in the 1st - 6th semesters (or courses totaling 180 ECTS, including the 30 ECTS internship).

The Bachelor thesis is prepared in groups of 2 or 3 students.

The Bachelor thesis comprises an independent experimental, empirical and / or research on a practical problem related to the core subjects of the programme.

The project must be documented in the form of a thesis that meets the requirements specified in the Guidelines for Semester and Bachelor Projects as well as in the BPR2 course description.

The student's performance is evaluated by an oral defense with individual assessment according to the learning objectives described under "3.1 Compulsory courses and projects". The basis for the exam is the bachelor thesis. It is a prerequisite for participation in the exam that the bachelor thesis is handed in within the stipulated deadline, and that it meets the project requirements described.

The examination may take place at the earliest when all the other exams and tests of the programme, including the internship test, have been passed. The examination is assessed on the 7-point scale and with the participation of an external examiner.

7. 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.

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Appendix 1 (for students enrolled in 2017)

For students enrolled in the GBE-program in 2017, the below structure is followed, due to the fact that the MAT B-admission requirement was introduced in 2018:

GBE-M:						
Semester	Course	Course	Course	Course/ project	Project	
9 th semester	Elective	Elective	BPR2 Bachelor Project			
8 th semester	INP1 Internship					
7 th semester	ME MDE1 Machine Design	ME ELE1 Electrical Engineering	MST1 Management & Strategy	SPE7 Semester Project		
6 th semester Study Abroad	ME MEC 2 Mechanics	ME MED 1 Machine Element Design	ME TER 1 Thermo-dynamics	Elective	Elective	Elective
5 th semester	ME TEM 1 Technological Processes and Environment	ME MTR 1 Materials Science	ME TDE 1 Technical Design	GER 3/ FRE 3/ SPA3/ DAN 3	SEP5 Semester Project	
4 th semester	ME DYN 1 Dynamics	ENB M 2 Electrical Engineering, Thermo-dynamics	GER 2/ FRE 2/ SPA 2/ DAN2	FCM1 Financial Management	INO1 Cross Disciplinary Innovation	SEP4 Semester Project
3 rd semester	ME MEC1 Statics	MAT3 Mathematics 3	GER 1/ FRE 1/ SPA 1/ DAN 1	BUE1 Business Economics	IBC1 Intercultural Business Communication	SEP3 Semester Project
2 nd semester	ENB M1 Introduction to M- engineering	MAT 2 Mathematics 2		GBC2 Global Business Communication 2	MAM2 Global Marketing Management	SEP2 Semester Project
1 st semester	ENB ICT1 Introduction to Software engineering	MAT1 Mathematics 1	GBC1 Global Business Communication 1	MAM1 Marketing Management	SSE1 Study Skills for Engineering Students	SEP1 Semester Project

GBE-ICT:						
Semester	Course	Course	Course	Course/ project	Project	
9 th semester	Elective	Elective	BPR 2 Bachelor project			
8 th semester	INP1 Internship					
7 th semester	IT DNP 1 .NET programming	IT ERP 1 ERP systems SAP ABAP/4 programming	MST1 Management & Strategy	SEP7 Semester Project		
6 th semester Study Abroad	IT WEE1 Web Engineering	IT BUI 1 Business intelligence	IT AND 1 Android Development	Elective - Software Engineering specialisation	Elective	Elective
5 th semester	Processes	IT SDJ 2 Software development with Java 2		GER 3/ FRE 3/ SPA3/ DAN 3	SEP5 Semester Project	
4 th semester	IT DBS 1 Database systems 1	IT RWD 1 Responsiveweb design	GER 2/ FRE 2/ SPA 2/ DAN 2	FCM1 Financial Management	INO1 Cross Disciplinary Innovation	SEP4 Semester Project
3 rd semester	IT SDJ 1 Software development with Java 1		GER 1/ FRE 1/ SPA 1/ DAN 1	BUE1 Business Economics	IBC1 Intercultural Business Communication	SEP3 Semester Project
2 nd semester	ENB M1 Introduction to M- engineering	MAT 2 Mathematics 2		GBC2 Global Business Communication 2	MAM2 Global Marketing Management	SEP2 Semester Project
1 st semester	ENB ICT1 Introduction to Software Engineering	MAT1 Mathematics 1	GBC1 Global Business Communication 1	MAM1 Marketing Management	SSE1 Study Skills for Engineering Students	SEP1 Semester Project