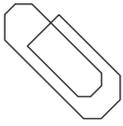


Unfold your talent
VIA University College



Curriculum

Programme section

Bachelor of Engineering, Civil Engineering

Valid from August 2017

INDHOLD

1	Identity of the programme	4
2	Structure and content	4
3	Compulsory courses of the programme	6
3.1	1. Semester: Sports Hall/Multi Centre	6
3.2	2. Semester: Highway around Horsens	7
3.3	3. Semester: Office Buildings	8
3.4	4. Semester: Expansion of the motorway and re-arrangement of rail	9
<hr/>		
4	Internship	9
5	Courses at 6th and 7th semester	10
5.1	Compulsory courses	10
5.2	Elective courses	10
<hr/>		
6	Bachelor Project	11
7	Title and issue of diploma	12

Introduction

In accordance with the Diploma Engineering Education programme, the purpose of the diploma-engineering programme is to qualify students to, nationally and internationally, carry out the following business functions;

- 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 task
- 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 endeavours 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 focused on the surrounding world. These goals are achieved in the form of qualified graduates obtained through targeted education, relevant 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 in an increasingly global market. Our lecturers have a broad practical experience, and they understand how to anchor theory in 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

We educate and train the future engineers to have basic knowledge within building and civil works. The focus of the program is to train engineers within project planning and execution of major constructions, infrastructural facilities, as well as planning, control and management of the building and civil works.

The aim of the civil engineering study program is that graduates have acquired skills in describing, formulating and communicating issues and results in a scientific context, as well as the ability to apply scientific method. Furthermore, they must be able to use the results of national and international research, experimental as well as development work.

The purpose of the programme is primarily achieved by:

- Making project work an essential part of the course in which the technical elements of the programme are integrated through problem solving, focusing on use-oriented and practical engineering work. Through the project work, it is also essential that the students develop technical, methodical, communicative and personal competences.
- Collaboration with research environments and companies in connection with the courses.
- Offering an international study environment, in which parts of the programme may be completed abroad.
- Using the student's internship actively to exchange knowledge and experience between VIA and the profession.
- Obtaining application and practice-oriented competences by using VIA's laboratory, workshops and library facilities.

2 Structure and content

The programme is organized as a full-time higher education. The programme structure, progression and included tests are indicated in the table at the end of this section.

The official duration of the degree program is 3½ years, divided into 7 semesters corresponding to 210 ECTS credits.

ECTS (European Credit Transfer System) indicates the workload and the duration of a study element, but not the severity. One ECTS point corresponds to a workload of 27.5 hours. An academic year of 60 ECTS thus corresponds to 1,650 hours of work for the student.

New students are enrolled twice a year in August and February.

English at B level is a prerequisite for understanding the study material and completing the degree program.

The programme consists of:

- Compulsory courses and projects
- Elective courses
- Internship
- Workshops
- Bachelor project

One semester consists of 3-6 delimited courses. One course may have a volume of 5 to 10 ECTS credits, and a project may have a volume of 5 to 20 ECTS credits.

The course topics, scope, learning objectives and tests are described in this curriculum.

For a more detailed and comprehensive description of the individual courses, reference is made to the course descriptions applicable at any time, and available on Studynet.

The programme structure is illustrated below:

Semester Theme	Course	Course	Course	Course/project	Course	
7. Electives	Elective course	Elective course	Elective course	CE-BPR2 Bachelor project		
6. Electives	CE-CMP2 Compulsory. Project Management in the Build Environment	Elective course	Elective course	CE-BPR1 Preparation of Bachelor Project	CE-SEP6 Semester Project	
5. Internship	CE-INP1 Internship					
4. Motorway connections and rail refurbishment	CE-CON2 Concrete Structures and Curing Technology	CE-INF2 Infrastructure - Railway and Road Design	CE-STD4 Computer Aided Structural Analysis	CE-SWO2 Soil Works 2	CE-INO1 Interdisciplinary Innovation project	CE-SEP4 Semester Project
3. Office buildings	CE-BEN2 Building Services, Indoor Environment and Energy Demand Analysis	CE-CMP1 Construction of In Situ Cast Concrete and Pre Cast Concrete Elements	CE-STD3 Structural Design, Concrete Structures and Soil Mechanics		CE-SEP3 Semester Project	
2. Highway around Horsens	CE-SCI2 Calculus, Linear Algebra and Dynamics	CE-INF1 Infrastructure - Highway Design in Rural Areas	CE-STD2 Elastic Strength of Materials and Design of Load Bearing Structures	CE-SWO1 Soil Works 1	CE-HYD1 Hydraulic and Drainage	CE-SEP2 Semester Project
1. Sports hall / Multi centre	CE-SCI1 Mathematical Analysis	CE-BEN1 Building Physics and Building Energy Demand	CE-STD1 Static Analysis and Load Determination	CE-BDE1 Building Design	CE-SSE1 Study Skills for Engineering Students	CE-SEP1 Semester Project

3 Compulsory courses of the programme

All courses and projects on the first four semesters are compulsory.

Each of the four semesters contains a semester project representing 5-10 erts credits. The main purpose of the semester project is to tie the subjects of the semester together to a unified whole.

Project Methodology, Philosophy of Science, Research Methods and Teamwork will be introduced through the programme in connection with semester projects.

There will be a common theme for each semester. Knowledge and skills are acquired through the courses, and competences are acquired and tested through the project work.

1. Semester: Sports Hall/Multi centre
2. Semester: Highway around Horsens
3. Semester: Office buildings
4. Semester: Expansion of the motorway and re-arrangement of rail

3.1 1. Semester: Sports Hall/Multi Centre

Topics

The overall theme of the 1st semester is "smaller sports-/industrial building".

The students will complete a project with focus on design and execution of certain constructions and installations in a large building including concrete, timber and steel.

The project work is completed in project groups, who cooperate in solving the challenges within the current theme, supported by participation in lectures.

Learning goals

Knowledge

At the end of 1st semester, the students must:

- obtain an understanding of the common rules for project design
- obtain a routine in the composition of project material at a level up to and including the pilot project

Skills:

Through planning and design of a smaller industrial building/sports facility, the student must be familiar with the most common principles for design, choice of materials, the building stability as well as leasehold in accordance with the building regulations. Furthermore, the students must calculate and design heating installations and ventilation. The building energy framework shall be calculated and documented.

Group cooperation as well as report writing and presentation technique will be put into practice through the completion of the project.

Competencies

At the end of the semester, the students must:

- Have knowledge of the rules for project planning in connection with smaller sports- / industrial buildings
- Have insight into the calculation methods and analytical tools for the execution and planning of a smaller sports or industrial building.

Volume

30 ECTS

Number of tests

Mathematical Analysis (SCI1)	5 ECTS	1 written test, 4 t.
Building Physics and Building Energy Demand (BEN1)	5 ECTS	1 oral test
Static Analysis and Load Determination (STD1)	5 ECTS	1 written test, 4 t.
Building Design (BDE1)	5 ECTS	Approval
Study Skills for Engineering Students (SSE1)	5 ECTS	Approval
Semester project: Sports hall/Multi Centre (SEP1)	5 ECTS	1 project exam

3.2 2. Semester: Highway around Horsens**Topics**

The overall theme of the 2nd semester is “Infrastructural planning”.

The students will complete a project, where they must plan an infrastructural project assignment.

The project work is completed in project groups, who cooperate in solving the challenges within the current theme, supported by participation in lectures.

The project groups will initiate their own project formulations and plan the project work however, the projects will be subject to certain minimums in relation to the extent and the analysis of the professional elements of the semester.

Learning goals**Knowledge**

At the end of the 2nd semester, the students must:

- obtain an understanding of planning and project design of infrastructural facilities
- obtain a routine in the completion of projects in this sector

Skills

At the end of the 2nd semester, the students must have:

- skills in applying learned knowledge to the solving of practical infrastructural project works
- the ability to convert the results of lab work into practical project oriented application
- the ability to plan and complete practical project works
- skills in communication of the project results to the client

Competencies

At the end of the semester, the students must:

- be able to use the knowledge obtained and the skills achieved during the semester, in order to perform analyses of infrastructural projects, including applicable solutions
- in cooperation with other students, be able to complete design of infrastructural projects related to the semester theme

Volume

30 ECTS

Number of tests

Calculus, Linear Algebra and Dynamics (SCI2)	5 ECTS	1 oral test
Infrastructure - Highway Design in Rural Areas (INF1)	5 ECTS	1 oral test
Elastic Strength of Materials and Design of Load Bearing Structures (STD2)	5 ECTS	1 oral test
Hydraulic and Drainage (HYD1)	5 ECTS	1 oral test
Soil Works 1 (SWO1)	5 ECTS	1 mid-term test
Semester Project: Highway around Horsens (SEP2)	5 ECTS	1 project exam

3.3 3. Semester: Office Buildings

Topics

The overall theme of the 3rd semester is “Structural Design – Larger Office Buildings”.

The semester project focuses on design, planning, completion of certain constructions and installations in larger buildings of concrete, timber and steel.

The project work is completed in project groups, who cooperate in solving the challenges within the current theme, supported by participation in lectures.

The project groups will initiate their own project formulations and plan the project work; and during the entire project process, the semester lecturers will provide necessary guidance to the project groups.

Learning goals

Knowledge

At the end of the 3rd semester, the students must have:

- obtained an understanding of the planning and design of large buildings
- become experienced in the implementation of building projects
- Obtained an understanding for planning and design for a multi-storey building in concrete and steel

Skills

At the end of the 3rd semester, the students must:

- be able to analyse the prerequisites, limitation and use of calculation methods for the design of building projects
- be able to analyse the interaction between design and execution of part elements in a building project
- have acquired general understanding of the building process’ planning and economy
- have acquired understanding of technical, economical and organizational aspects of the execution phase
- have the ability to analyse a structure for the generation of alternative designs
- have the ability to calculate and design structures in steel, timber, concrete and geotechniques
- be able to perform analysis of building services, and calculate a complete energy framework for the building
- be able to design ventilation system
- be able to understanding the use of IT tools for design, modelling and execution

Competencies

At the end of the 3rd semester, the students must:

- be able to use the knowledge obtained and the skills achieved during the semester, in order to plan and design large house building
- have obtained insight into the completion of construction projects and have achieved a certain routine within this area.

Volume

30 ECTS

Number of tests

Building Services, Indoor Environment and Energy Demand Analysis (BEN2)	5 ECTS	1 oral test
Construction of In Situ Cast Concrete and Pre Cast Concrete Elements (CMP1)	10 ECTS	1 oral test
Structural Design, Concrete Structures and Soil Mechanics (STD3)	5 ECTS	Approval
Semester project (SEP3)	10 ECTS	1 project exam

3.4 4. Semester: Motorway connections and rail refurbishment

Topics

The overall theme of the 4th semester is “Construction work in open areas”

The students complete projects with a focus on planning, road design in open areas, including the design and completion of certain structures.

The project groups will initiate their own project formulations and plan the project work; and during the entire project process, the semester lecturers will provide necessary guidance to the project groups.

Learning goals

Knowledge

At the end of the 4th semester, the students must have:

- obtained an understanding of the planning and design of infrastructural constructions in open land
- become skilled in the execution of projects within this area

Skills:

At the end of the 4th semester, the students must:

- show understanding of the project complexity
- be able to use the knowledge from related courses
- be able to analyse and use the data collected from practical activities and calculations
- set up, describe and interpret the collected data, including the development of competencies
- be able to prepare and present the actual project material

Competencies

At the end of the 4th semester, the students must:

- be able to use the knowledge obtained and the skills achieved during the semester, in order to plan and design construction in open areas.
- have obtained insight into the completion of construction projects, including applicable soil constructions and have achieved a certain routine within this area.

Volume

30 ECTS

Number of tests

Concrete Structures and Curing Technology (CON2)	5 ECTS	1 oral test
Infrastructure - Railway and Urban road Design (INF2))	5 ECTS	???
Computer Aided Structural Analysis (STD4)	5 ECTS	1 oral test
Soil Works 2 (SWO2)	5 ECTS	1 mid-term test
Semester project: Expansion of the motorway and re-arrangement of rail (SEP4) incl. Interdisciplinary Innovation project (INO1)	5 ECTS	1 project exam

4 Internship

CE-INP1

The internship comprises a semester of 30 ECTS and it is placed on the 5th 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 four semesters.

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

- All courses on 1.-4. semester must be passed / approved
- Workshop courses must be passed / approved or exempted

The student is responsible for finding an internship host organization, which must be approved by VIA, who will also allocate a supervisor for the intern.

In cooperation with the company, the student prepares a plan for the internship programme including an assignment formulation.

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

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

The internship is assessed approved / not approved.

5 Courses at 6th and 7th semester

On the 6th and 7th semester, the students may be pinpointing their education by choosing elective courses within the same subject area. Alternatively, they can choose freely between all subject areas.

Description of the individual courses is stated in section 5.2 as well as the course descriptions.

It is also possible to choose elective courses offered by VIA's other Programmes, except courses which consists of elements from the student's previous academic record. Selecting courses from other Programmes must be approved by an Engineering study counsellor in order to secure the relevance and an increase of the technical level.

5.1 Compulsory courses

Compulsory course at 6./7. Semester, for all students on Civil Engineering programme.

Project Management in the Build Environment (CMP2)	5 ECTS	1 oral test
--	--------	-------------

5.2 Elective courses

The following electives are available at the Civil Engineering programme:

Overall elective courses:

Basic GIS 1 (GIS1)	2 ECTS	1 written test
--------------------	--------	----------------

Electives within the subject area of construction:

Economy in Building design and construction (CMP3)	5 ECTS	Approval
General Project Management Principles in Technology project	5 ECTS	Approval

Electives within the subject area of geotechniques:

Deep Excavations and Slopes in Urban Areas (DEX1)	5 ECTS	1 oral test
Geotechnical analysis of building and construction projects (GEO5)	5 ECTS	Approval

Electives within the subject area of infrastructure:

Traffic and Cross Roads (ROA4)	5 ECTS	Approval
Roads and squares in Urban and City Areas (ROA5)	5 ECTS	Approval
Sustainable City Planning (PLA1)	5 ECTS	Approval
Basic Railway Planning and Design	5 ECTS	Approval

Electives within the subject area of installation:

Indoor Environment and Ventilation Systems (INE1/VEN1)	5 ECTS	1 oral test
Sustainable Buildings (SUB)	5 ECTS	Approval
Energy Renovation	5 ECTS	Approval
Shallow Geothermal Systems	5 ECTS	1 oral test

Electives within the subject area of construction:

Element Building – Concrete Statics (ELM1)	5 ECTS	Approval
Basic Theory of Plasticity - Beams, Frames and Slabs (BTP1)	5 ECTS	1 written test
Finite Element Method for Frame and Plate Structures (FEM1)	5 ECTS	Approval
Steel Structures (STU1)	5 ECTS	1 written test
Post Tensioned Concrete Structures (PTC1)	5 ECTS	1 written test
Masonry and Timber Structures (MAS1/TIM1)	5 ECTS	Approval

6 Bachelor Project

CE-BPR1

CE-BPR2

The programme is concluded with a bachelor project (BPR2) which constitutes 20 ECTS and is assessed with an oral test. The bachelor project commences on the 6th semester (BPR1), where the student must choose the subject for the project and prepare the project description.

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

The conditions for starting the bachelor project, BPR2, are that the student has passed all courses in the 1st - 6th semester (or courses totalling 180 ECTS, including the 30 ECTS internship) and the bachelor preparatory course BPR1 has been completed.

The Bachelor project is prepared in groups of at least three persons. However, the head of programme may exceptionally dispense with this rule.

The Bachelor project comprises an independent experimental, empirical and / or theoretical examination of a practical problem formulation related to the core subjects of the programme.

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

The students are examined in the project by an oral test / group test with individual assessment according to the learning objectives described under section 1 of this curriculum. The basis for the exam is the bachelor project. It is a prerequisite for participation in the exam that the bachelor project 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 tests of the programme, including internship, have been passed. The examination is assessed on the 7-point scale and with the participation of external examiner.

7 Title and issue of diploma

Graduates who have completed the studies under this curriculum as well as the joint regulations for VIA Engineering is entitled to use the title Bachelor of Engineering in Civil Engineering.

For the completion of the programme, VIA University College issues a diploma, specifying the title as well as the result of the achieved assessments. The diploma furthermore details the subjects of the project in the 6th semester and the bachelor project. Grounds of admission to the program are also specified.

If the programme is withdrawn, VIA issues a certificate for the completed/passed courses.

The graduates will receive the diploma in e-Boks no later than 5 weekdays after graduation.