



SEMESTER SYLLABUS

SEMESTER 3 INDUSTRY AND PREFABRICATION



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WELCOME TO SEMESTER 3

You have now reached the first semester in the learning environment we call 'Professionalization'. This means that the demands on you and your fellow students now more closely resemble those that will be made on you in your future professional life. We now expect you to know your own learning style and to have a good understanding of the project-based approach to learning.

This third semester consists of a National subject element and a local subject element.

The National subject element deals with 'Industry and Prefabrication'. Up to this point, you have done a lot of work on the structural design of small houses. In this semester, you will be learning about the relationship between designing an industrialized building, organizing the production and delivery of the building elements and, finally, organizing the installation work. There will also be a focus on the respective tasks of consultants, manufacturers and contractors. Particular emphasis will be laid on your gaining an understanding of the importance of good, timely communication during the building process.

The semester's National subject element carries 25 ECTS credits and includes the following subject areas:

- Business 5 ECTS credits
- Communication and Collaboration 5 ECTS credits
- Production 10 ECTS credits
- Structural Design 5 ECTS credits

The local subject element is concerned with 'Innovation and Entrepreneurship'. The purpose of the local subject element is for you to learn about creativity, innovation and entrepreneurship, enabling you to engage in innovative processes in interprofessional settings. We expect you to use this learning when working on projects going forward.

The semester's local subject element carries 5 ECTS credits.

The indicative semester timetable will be reviewed at the beginning of the semester. The indicative timetable will then be available on Itslearning.

At the end of this semester, you must decide whether you wish to leave after Semester 4 with an Academy Profession Degree in Construction Technology, or complete the Professional Bachelor's Degree Programme, graduating in Architectural Technology and Construction Management after Semester 7. Consider the sort of work you want to do, your financial position and your study situation. If you are in doubt about your study skills or your choice of programme pathway, we encourage you to have a chat with one of the programme's student advisors, or perhaps with one of your internship manuals.

Student Council

At VIA, there is one combined Student Council per campus, with class representatives from across the programmes. There is also a local Student Council for the Architectural Technology and Construction Management programme, known as the Architectural Technology Student Council. Management at VIA Built Environment in Horsens, Aarhus and Holstebro continually involve their respective local Architectural Technology Student Councils in discussions on the quality assurance and quality development of the programme, including: employer involvement, graduate involvement, final evaluation of teaching, final evaluation of internships in Denmark and abroad, final evaluation of study visits abroad, the learning barometer survey and dropout analysis.

Quality assurance

As a student, you are expected to play an active part in quality assurance procedures on the programme. Among other things, this means that you are expected to take part in the halfway evaluation at the midpoint of each semester and in the final evaluation, which takes place every third time a semester is com-



pleted. The halfway evaluation is conducted by a member of teaching staff. The idea of the halfway evaluation is that the information gathered from you can be used to develop and adapt the current course of instruction. The purpose of final evaluation is for the programme team to collect from you information that can be used to improve the organization and conduct of teaching on the programme with a view to the programme's coherence and progression.

You can access results, KPIs and action plans on Studienet (Aarhus) and Studienet (Horsens) and where further information about quality procedures at VIA University College is also available.



SEMESTER STRUCTURE

The semester is described in the curriculum and in this semester syllabus. Link to curriculum: click [here](#). The content of the semester project will be described in more detail in the semester case study issued at the start of the semester.

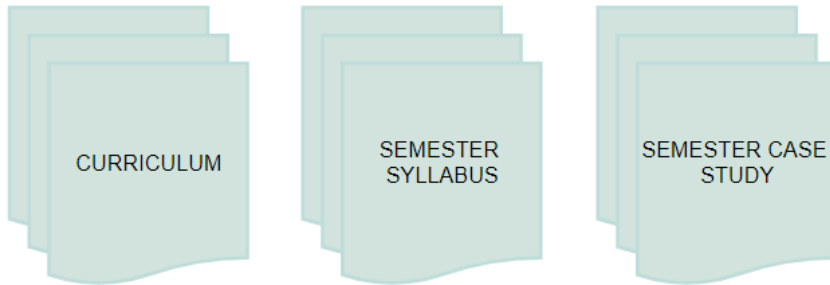


Figure 1: Document hierarchy, Semesters 1-5
Source: Prepared at VIA Built Environment

In the semester's 'Industry and Prefabrication' national subject element, you will mainly be working on one continuing project. As shown in Figure 2, each subject will be aimed at the project. Theoretical presentations by teaching staff will often be concentrated at the start of the course; later, the teachers will mainly assist with guidance and advice on the project. It is through the process of working to solve the problems set that you, the student, will develop your competency as an Bachelor of Architectural Technology and Construction Management.

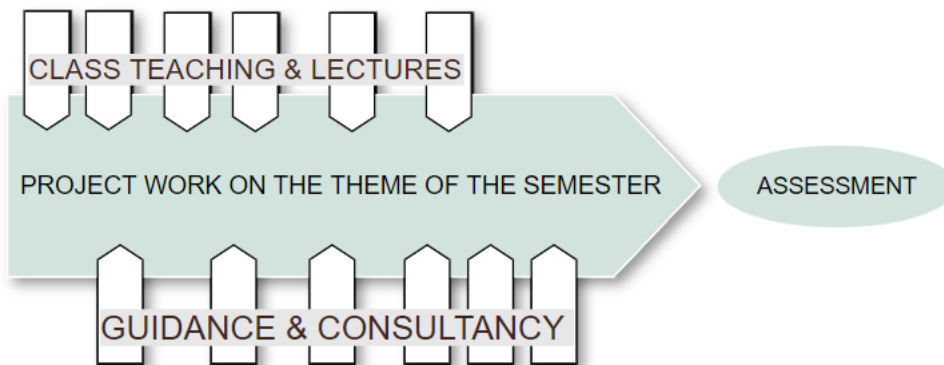


Figure 2: Interdisciplinary project work
Source: Prepared at VIA Built Environment

PROJECT WORK

Students work on an interdisciplinary project throughout the semester. The project work consists partly of assignments to be tackled individually and partly of assignments to be tackled in groups. The reason for working in groups on a specific project is partly that this working style reflects the forms of collaboration used in the industry, and partly that there is learning value in problem-focused collaboration with other students whose experience and skills are different to yours. Although students work in groups, it is nevertheless important that you as a student can independently acquire and apply the knowledge you gain from the individual subjects.



TEACHING

Teaching is based on the principles of problem-based learning (PBL), in which the teaching staff act as guides. This form of instruction is combined with academic presentations in the form of classroom/auditorium teaching. Students work on different types of building technology problems and the administration of a building project. In the course of their day-to-day studies, students are expected to present sketches, provisional drawings and solution proposals for discussion by students and teachers. The Portfolio and study technique are important tools of the programme, to be used to reflect on your own learning.

EXAMINATIONS

As a student, you must take a number of examinations/evaluations in the course of your studies. There is information on these in Chapter 7.7 of the curriculum, *Examinations*. The curriculum is available [here](#). General information on examinations is available on [Studienet \(Horsens\)](#) and [Studienet \(Aarhus\)](#). Table 1 shows the semester's subject elements and how they are assessed, in accordance with Chapter 7.4 of the Curriculum.

Study element	Assessed before concluding examination	Assessed at concluding examination
Examination 2: Project work on Industry and Prefabrication plus Portfolio		X
Examination 3: Presentation of project work on Elective 1	X	

Table 1: Study elements and their assessment
Source: Prepared at VIA Built Environment



STUDY ACTIVITY

Full study activity means that the student spends 825 hours per semester, i.e. approximately 41 hours per week, on study. The study activity model shows how these hours are divided between different teaching and working formats. Not all learning is to be initiated by teaching staff and/or with a member of staff present; this means that you, the student, bear considerable responsibility for your own learning.

The programme involves training in both professional skills and independence in order to equip the student to take on highly responsible professional roles. The student is expected to assume greater independent responsibility semester by semester.

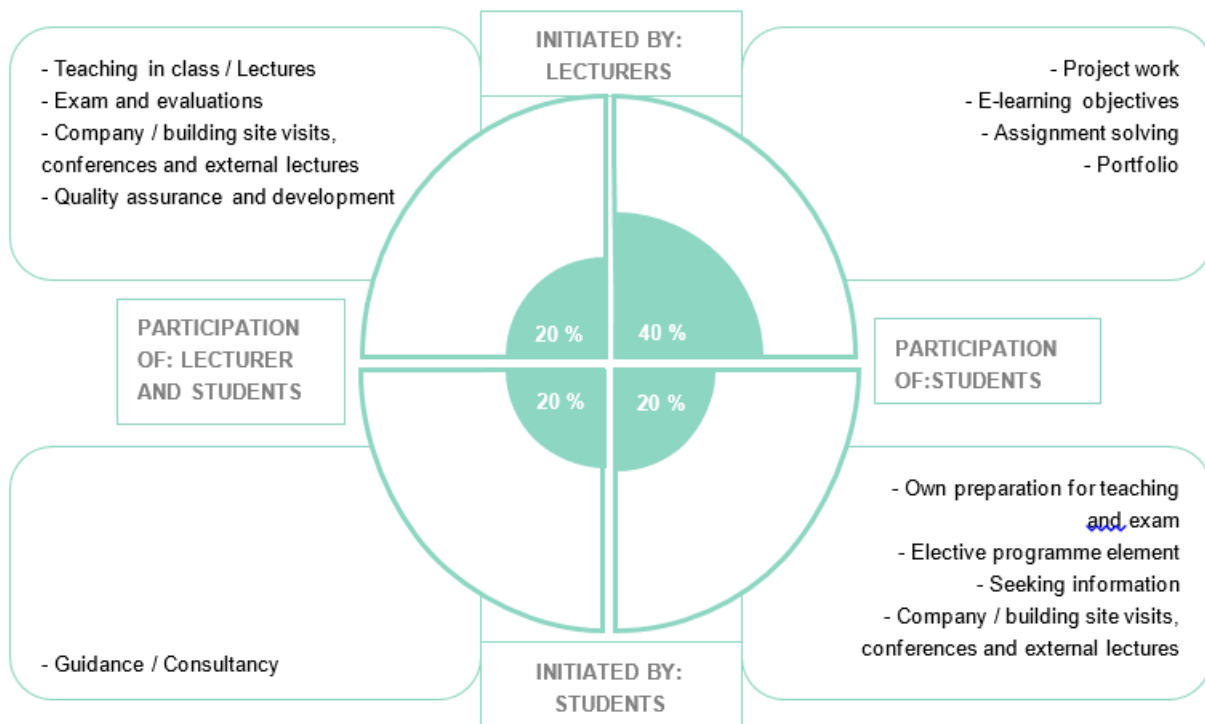


Figure 3: Semester 3 study activity model
 Source: Prepared at VIA Built Environment



SUBJECTS

The programme's interdisciplinary learning objectives for Semester 3 are set out in the section of the curriculum on the national subject elements of the programme.

The point of departure for instruction in the individual subjects is the semester's interdisciplinary project. Single-subject teaching covers rules, theories, methods and techniques within each specific professional discipline. The teaching of the individual subjects will also indicate how the content of the subject can be brought to bear on the interdisciplinary work on the semester case study.

The content of the individual subjects is described on the following pages. The content is described at a general explanatory level. The precise teaching topics within the subjects are set out in the teaching schedule, which is available on Itslearning at the beginning of the semester.

Examples of subject-based interpretations of the Semester 3 interdisciplinary learning objectives for the individual subjects are given in Annex 1.

Both separately and together with your project work, the subject-based presentations of the individual subjects will support your attainment of the semester's learning objectives.

Table 2, below, shows the subject distribution of the semester in percentage terms.

Subject	Subject areas	Distribution
Building design (BDS)	Architecture and Building Design (BDS/ABD) Building Construction (BDS/BCN) Materials Science (BDS/MAT)	36%
Structural design (STD)	Structural design (STD)	8%
Building services (BSE)	Building services (BSE)	12%
Building Planning and Management (BPM)	Building Planning and Management (BPM)	29%
Communication (COM)	Communication (COM)	5%
Law (LAW)	Law (LAW)	10%

Table 2: Subjects, subject areas and subject distribution in Semester 3
Source: Prepared at VIA Built Environment



BUILDING DESIGN (BDS)

The Building design subject comprises the Architecture and Building Design, Building Construction and Materials Science elements.

Teaching will be based on the following content:

Architecture and Building Design (ABD)

- architecture and building design in relation to industrialized building
- sketching and structural design methodology using analogue and digital tools

Building Construction (BCN)

- structural design technique and analysis of structures for wide-span prefabricated buildings
- damp in buildings and structures
- sustainable design of building elements in a manufacturing and installation company
- developing tender documents
- analogue and digital tools in the design and communication of building works
- relevant company and site visits

Materials Science (MAT)

- briefing on construction joints
- knowledge of timber, concrete, roofing materials and sheet materials
- insight into thermal insulation materials
- material and building element analysis
- environmental considerations in the choice of materials
- material descriptions in the content journal
- material descriptions on drawings linked to a building information model

STRUCTURAL DESIGN (STD)

Teaching will be based on the following content:

- static analysis and building systems
- force-transmitting connections and load transfer
- estimated dimensioning and stability of industrialized building
- concrete elements: stability, load-bearing capacity, reinforcement
- timber elements: stability, load-bearing capacity and anchoring
- lifting points and bracings for installation
- static documentation and communication

BUILDING SERVICES (BSE)

Teaching will be based on the following content:

- principles of heating in larger buildings
- principles of mechanical balanced ventilation; systems and principles
- principles of ducts and service installations
- introduction to Revit MEP
- identification of, and connection to, mains supply pipes
- damp theory and calculations



BUILDING PLANNING AND MANAGEMENT (BPM)

Teaching will be based on the following content:

- transport logistics
- study planning, collaboration and resource management
- business
- types of contract and award procedure
- construction scheduling
- calculation, quantity take-off and tender documents, including tender price of the chosen contract
- the content journal
- quality assurance
- relevant working environment topics, including building site layout and the health and safety plan
- waste management
- relevant recommendations including scrutiny tools and description tools
- relevant company and site visits

COMMUNICATION (COM)

Teaching will be based on the following content:

- problem-based learning (PBL), project-oriented and case-based
- the effective team: definition, development and challenges
- portfolio writing, with emphasis on professionalism
- professional communication, including drawings and email

LAW (LAW)

Teaching will be based on the following content:

- hierarchy of laws
- basic law of contract
- standard construction contracts (roles and responsibilities)
- basic law of torts
- basic contract law including rules of interpretation
- procurement law with reference to the Semester 3 case study, e.g. time and risk management in the tendering phase
- company law (partnerships vs limited companies)
- debt liability and bankruptcy
- ABR (General Conditions for Consultancy Services), focusing on the consultant-client relationship with reference to the consultant's liability for design faults
- AB (General Conditions for Works and Supplies), focusing on the contractor-client relationship with reference to the contractor's time and financial management
- the contractor-supplier relationship, focusing on delivery conditions contrary to AB.
- recourse to court, arbitration and Procurement Board practice



LOCAL SUBJECT ELEMENT

A local subject element is defined as either a local Elective programme element (EPE) or a local programme element (LPE).

The local subject element on Semester 3 is an Elective programme element (EPE) – the first of six local subject elements distributed over Semesters 3, 4, 5 and 7.

The figure below illustrates the ECTS rating of the EPE alone in relation to the national Industry and Pre-fabrication subject element.



Figure 4: ECTS distribution, Semester 3
Source: curriculum

ELECTIVE SUBJECT ELEMENT

The learning objectives and content of the courses are described in detail in the institutional part of the curriculum, under Section 7.1, *Elective programme elements (EPEs)* and 7.1.1, *Elective programme element, Semester 3*.



ANNEX 1

SUBJECT-BASED INTERPRETATION OF LEARNING OBJECTIVES

This annex presents an indicative interpretation of parts of the Semester 3 learning objectives of the curriculum in relation to the individual subjects. The interpretation may help you gain a concrete understanding of some of what is expected, but it does not give an exhaustive picture of what you must learn during the semester. Indeed, part of what you must learn is interdisciplinary and not amenable to being described within the framework of the individual subjects.

To get a full grasp of what you are expected to learn, you therefore need to read the semester learning objectives in the curriculum. Part of the Semester 3 interdisciplinary learning objectives set out in the curriculum can be summed up as follows: that you are able to familiarize yourself with and perform the various roles associated with, as the case may be, structural design, industrial element production and the organization of the construction of large buildings such as industrial buildings or sports halls. Your professional approach will be judged on your ability to assimilate, execute and communicate the relevant, necessary descriptions and drawings associated with each of the various phases and roles you will be allotted in the course of this semester's interdisciplinary project: from production management consultant to execution project manager. This includes your ability to present and defend the above to your fellow students and your internship manuals.

Overview of learning objectives supported by instruction in the individual subjects

Building design (BDS)

The Building design subject comprises the Architecture and Building Design, Building Construction and Materials Science elements.

Architecture and Building Design (ABD)

Knowledge

The student shall possess development-based knowledge of:

- and be able to understand the concepts, methods and practice of the discipline as they relate to the National subject element of the semester;
- architectural history and architectural techniques in relation to the national subject element;
- the relationship between functional requirements, material choices, aesthetics and sustainability in industrialized building.

Skills

The student shall be able to:

- show proficiency in sketching as a design and layout tool;
- evaluate functions, structures and material choices, and make informed overall choices relating to architecture.

Building Construction (BCN)

Knowledge

The student shall possess development-based knowledge of:

- and be able to understand and reflect on methods and techniques of planning, designing and constructing wide-span buildings constructed using industrialized building processes and building elements;
- and be able to understand and reflect on the fundamental principles of building element design from the design phase to the production and execution phase, with emphasis on prefabricated elements;
- and be able to understand and reflect on the principles of building physics;



- modern building methods and building structures, with emphasis on industrial production and sustainability aspects;
- analogue and digital tools for building design and communication.

Skills

The student shall be able to:

- evaluate, substantiate and select building structures for industrialized wide-span buildings, including sustainable and environmentally friendly choices;
- evaluate a prefabricated building and develop it from preliminary design through parts of building regulations approval to execution;
- show proficiency in the preparation of documentation;
- communicate practice-oriented and professional problems and solutions regarding prefabricated building in the design and execution phases using digital building information models, and transfer and extract data between different digital platforms and information systems.

Materials Science (MAT)

Knowledge

The student shall possess development-based knowledge of:

- and be able to understand the composition and use of materials in relation to the National subject element of the semester;
- production tolerances, installation tolerances and quality control;
- and be able to understand the incorporation of materials into structures, their function and performance in relation to use, including relevant buildings.

Skills

The student shall be able to:

- analyse, substantiate and select materials for incorporation into prefabricated structures;
- evaluate and document material choices on the basis of the buildings of the materials;
- show proficiency in compiling a content journal and material descriptions on drawings.

Structural design (STD)

Knowledge

The student shall possess development-based knowledge of:

- different types of load-bearing and non-load-bearing façade elements;
- the load-bearing and bracing system;
- and be able to understand force-transmitting connections;
- structural composition of façade elements;
- property data relevant to static conditions requirements in the BIM model
- sustainability aspects of production, transport and installation

Skills:

The student shall be able to:

- evaluate, substantiate and communicate static systems;
- evaluate and substantiate force-transmitting connections;
- communicate estimated calculations and working drawings for element production;
- evaluate and analyse optimal divisions of industrially produced façade elements in relation to static requirements and loads;
- communicate regarding the handling of façade elements.

Building services (BSE)

Knowledge

The student shall possess development-based knowledge of:

- types of heating in large buildings and offices;
- different ventilation systems and principles in non-residential buildings;



- and be able to understand factors affecting the indoor climate;
- and be able to understand energy consumption requirements and the calculation of the building's energy framework;
- damp theory and calculations.

Skills

The student shall be able to:

- analyse and communicate typical service installations and ducts;
- analyse, calculate and evaluate space requirements for a ventilation system;
- use and evaluate the building envelope in energy framework calculations in accordance with the Building Regulations.

Building Planning and Management (BPM)

Knowledge

The student shall possess development-based knowledge of:

- and be able to understand resource management in connection with groupwork;
- and be able to understand groupwork, and reflect on its significance to practice in the profession;
- organizational structure, including the role of the manager in different types of organization;
- the administrative and financial management of building companies, with particular attention to design and project management;
- and be able to understand and reflect on the choice of award procedures, contract types and contract demarcation;
- calculation of construction costs;
- the Working Environment Act, and be able to reflect on safety procedures in contracting companies and on the health and safety plan;
- relevant production technologies and relevant environmental and safety provisions;
- and be able to understand quality assurance procedures and quality inspections in connection with production and installation, including production and installation tolerances;
- and be able to understand BIM methodology, including the use of a project portal;
- and be able to understand transport and construction site logistics, and reflect on its use in connection with element installation.

Skills

The student shall be able to:

- apply and show proficiency in independent planning and carry out team planning and follow-up at supervision sessions;
- plan project work appropriately on both a group and an individual basis;
- use an appropriate document structure for the group's project work, including drawing numbering;
- apply and show proficiency in common planning, control and project management methods as producer and contractor (execution planning);
- use and show proficiency in successive calculation;
- using scrutiny of the outline proposal and preliminary design, evaluate scrutiny results and substantiate and select proposed solutions for further design (follow-up);
- use quantity take-offs from a BIM model in increasingly detailed calculations as the project phases proceed;
- use common methods to draw up documents necessary for putting the element contract out to tender;
- plan factory production of elements;
- use a relevant platform to exchange project documentation;
- evaluate tender documents and carry out quality assurance, design scrutiny, risk assessment and monitoring plans;
- substantiate and select a element installation method, including a workplace assessment, and evaluate the health and safety plan;



- communicate practice-oriented and professional problems at the launch and in the operation of a company, including budgeting, organization, production planning and tendering, and be able to communicate reflections on these.

Communication (COM)

Knowledge

The student shall possess development-based knowledge of:

- what characterizes an effective team;
- and be able to understand and reflect on the requirements for professional communication, with emphasis on email and drawings.

Skills

The student shall be able to:

- use portfolio writing, taking into account the new learning environment, Professionalization;
- use collaboration methods in the group, and plan, conduct and follow up supervision sessions more independently;
- consciously apply the fundamental principles of problem-based learning to his/her studies;
- use his/her personal competencies or learning styles, and those of other group members, in groupwork;
- use English words and phrases relating to construction;
- evaluate and communicate models and systems with a bearing on the work of the group, such as motivation, group organization, roles, conflicts etc.;
- communicate practice-oriented problems and solutions to partners and users, orally and in writing.

Law (LAW)

Knowledge

The student shall possess development-based knowledge of:

- and be able to understand the structure of the legal order, and legal method;
- and be able to understand and reflect on the fundamentals of contract law, with emphasis on the conclusion and interpretation of contracts;
- and be able to understand and reflect on the use of the construction industry's standard contract agreements, with emphasis on the division of roles and responsibilities in different types of contract in accordance with the General Conditions;
- and be able to understand the fundamentals of the law of torts, within or without contract;
- and be able to understand and reflect on practice in the areas indicated;
- and be able to understand and reflect on the significance of procurement regulations for the National subject element of the semester;
- and be able to understand and reflect on the options for and regulations on establishing one's own business in the profession;
- and be able to understand and reflect on the use of company types and organizational forms in connection with business start-up and operation, including liability and bankruptcy;

Skills

The student shall be able to:

- carry out and show proficiency in scrutiny of the legal basis of the conclusion of contracts, and prepare a legal risk assessment in the company;
- carry out and show proficiency in the preparation of contracts and General Conditions for Building and Construction Works and Supplies, with emphasis on the Client-Contractor-Supplier relationship, with reference to the Contractor's risk management, time management and financial management, particularly in respect of defects, time/delays and payment;
- communicate an account of the selected contract type and its characteristics in relation to other customary contract types;
- communicate an account of the regulatory basis for collection of tenders in relation to the semester case study.