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VIA University College



# SEMESTER SYLLABUS

## 4TH SEMESTER

MULTI-STOREY BUILDINGS > 3 STO-  
REYS AND ELECTIVE PROGRAMME  
ELEMENT

Bachelor of Architectural Technology and Construction Management

VIA University College Aarhus

Spring 2018

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# SEMESTER SYLLABUS

## Welcome to the 4<sup>th</sup> semester!

You have now reached the second semester in the study environment we call 'professionalization'. We now expect you and your fellow students to be able to work more independently than previously. You now have to be able to seek new knowledge, analyze problems and make well-founded decisions.

The theme of the semester project is 'Multi-storey buildings – with dwellings and commercial units'. Working with the project, you and your group will learn about increasingly complex demands to appliance, constructions and materials when designing and implementing a larger, contemporary building.

Furthermore, there is an elective programme element this semester where you have to write a report based on a topic of your choice.

This gives you the opportunity to shape your education in accordance with what you wish to do after the 7<sup>th</sup> semester.

In relation to the elective programme element, you will be introduced to the basic principles within philosophy of science – adjusted to the ATCM-programme.

During the course of this semester, you have to decide what direction you want to go in the 5<sup>th</sup> semester: architectural technology or construction management.

## Quality assurance and development

In the following links, you can find the latest action plans, developed by the programme management based on your assessments.

Find other action plans in relation to the work with quality assurance and development of the study programme on [Studynet \(Aarhus\)](#).

Join [VIA Bygningskonstruktør / Architectural Technology and Construction Management](#) on LinkedIn and become a part of a professional network with other students, graduates, teachers and employers.

## Reading guide

To guide you about the different semesters in this programme, a semester syllabus has been developed for each semester. The semester syllabus contains three main sections:

**1. The programme.** This section describes the basic approach to the pedagogy and teaching-forms, including our expectations of you in terms of achieving the learning aims. This section also describes our work with quality assurance and development of the programme and the role you play in this context.

**2. The semester.** This section starts with a brief description of the overall planning of the semester, followed by a brief specification of requirements and prerequisites for admission on the semester as well as the overall learning objectives for the semester. Subsequently, you will find a detailed description of semester content, i.e. the cross-disciplinary project, including single subjects and other elements. Finally, the main section describes how to assess the fulfillment of your learning aims, through tests and evaluations, and what criteria form the basis for the evaluation.

**3. The teaching.** This section contains a description prepared by the semester team (teachers) detailing the specific project/case and includes a teaching plan and a list of references. The project work in the specific semester is planned by the teacher team and is tailored to meet the class and to the students' background. Consequently, there will be differences in the planning and organizing of teaching in Danish versus international classes. Likewise, differences may occur in the way teaching is planned and organized at the different campuses. Such differences level out as the programme progresses.

# 1 THE PROGRAMME

The Architectural Technology and Construction Management programme is organized as a full-time education with 7 semesters, equivalent to 210 ECTS-points. The Construction Technologist Programme consists of 4 full-time semesters corresponding to 120 ECTS-points. Each ECTS-point corresponds to a workload of 27.5 hours and each semester is organized over 20 weeks, including the exam. Hence, you are expected to spend approximately 41 hours per week on your education<sup>1</sup>.

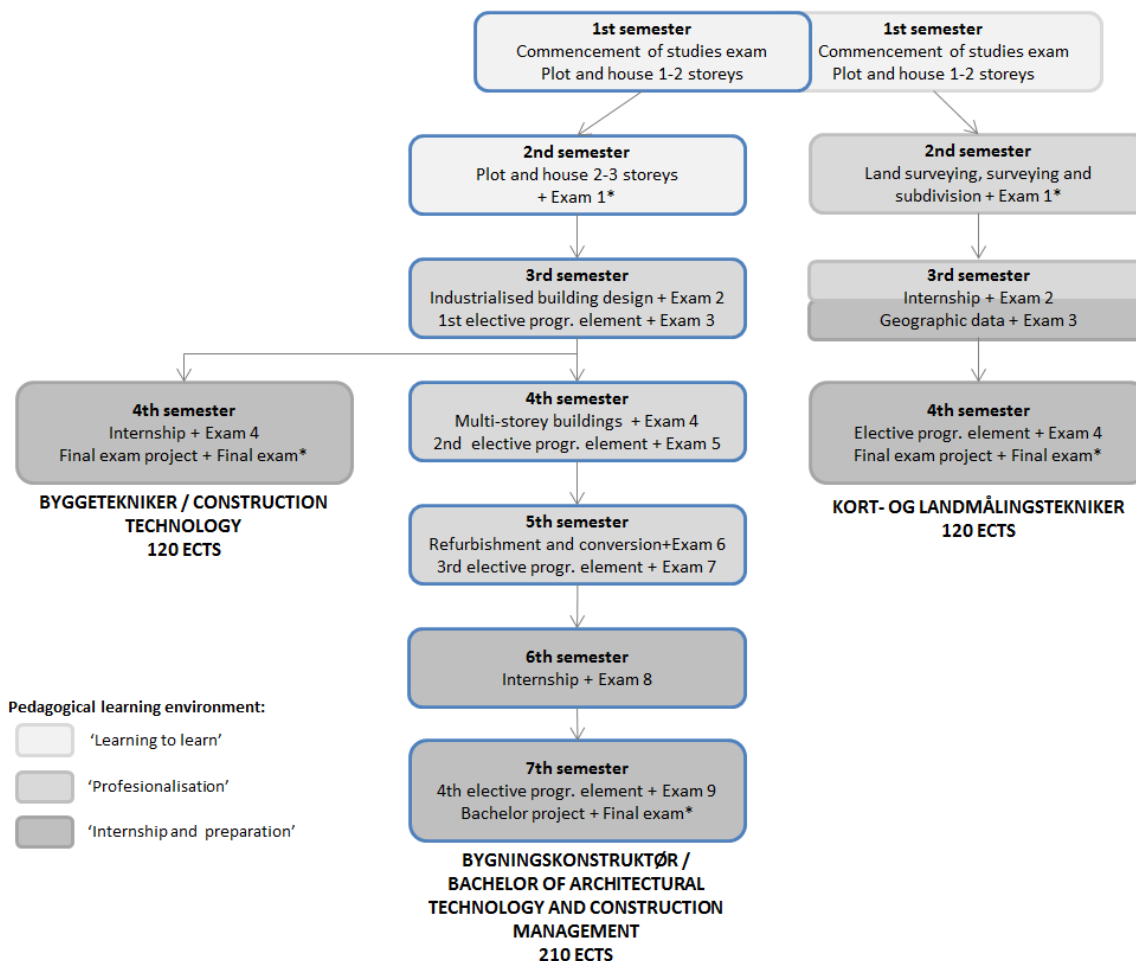
As a student, you have your own 'workplace' at the college, which we encourage you to use. The 'workplace' will change from semester to semester, depending on the size of the classes and your choice of specialization.

You also have access to resources and equipment made available to you by the campus. The type of resources and equipment may vary slightly from campus to campus.

## 1.1 The study environments

The programme is based on three different study environments, ensuring a natural progression in the learning during the course of the programme, see Figure 1:

Figure 1: The three study environments at VIA Built Environment



Source: Created at VIA Built Environment

<sup>1</sup> During the internship, a workload of approximately 37 hours/week is accepted.

### "Learning to learn"

This environment emphasizes the learning of how to be a successful student – finding your own learning style and gaining good study- and work-habits. Furthermore, special emphasis is put on Portfolio as the controlling element which ensures focus on the process oriented approach.

### "Professionalization"

This environment increases focus on the professional content of the projects. At the same time, your ability to learn yourself is enhanced. This happens in relation with you learning more about advanced methods for carrying out analyses.

### "Internship and job preparation"

Through the internship in a company of your own choice, the elective programme element and bachelor project, you are required to immerse yourself further and independently into the relation between theory and practice.

## 1.2 Teaching- and workforms

The Architectural Technology and Construction Management programme is based on Problem-based Learning (PBL). That is, the turning point in each of the compulsory programme elements is one cross-disciplinary project. In the work with the project problems, the student develops and demonstrates gained knowledge, skills and competences across the academic areas of the semester.

To prepare the student as much as possible for the profession, the primary work form is group work. Other teaching and workforms are organised in relation to the project work. Theory lessons are primarily placed in the beginning of the compulsory programme element, as it is seen as general contributions within the theme of the semester.

Besides from this, the student has to seek and process anything else that might be relevant for carrying out the project.

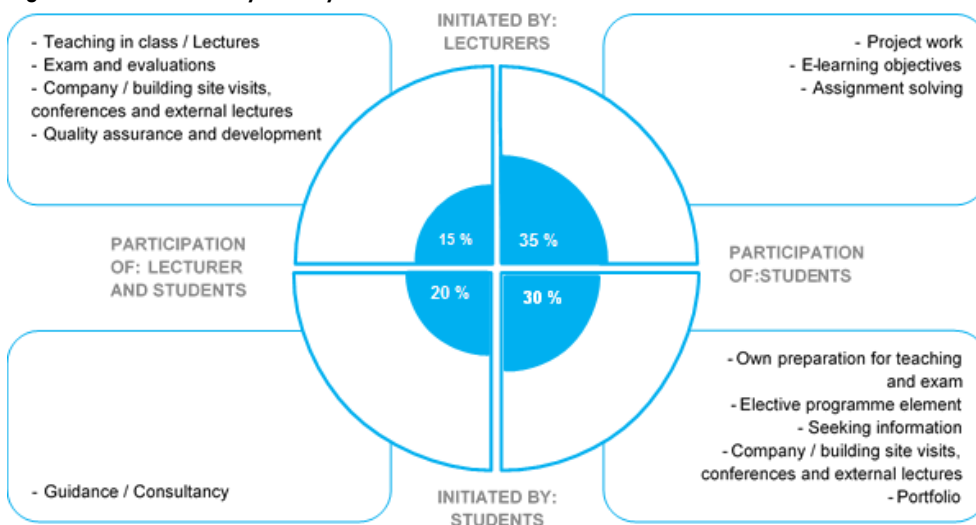
Portfolio is an important tool in the study programme, which you are to use to reflect upon your own learning.

The teaching- and workforms used in this semester are presented in the semester Study activity model.

The Study activity model clarifies partly that we expect you as a student to spend approximately 825 hours in each semester, partly that there are different types of teaching- and workforms which indicate that not all learning is initiated by a teacher and/or with the presence of a teacher. I.e., as a student you also carry a great responsibility for your own learning.

Hence the study activity model is also an illustration of what we expect from you as a student and what you can expect from us in relation to reaching the learning objectives.

Figure 2: Semester Study activity model

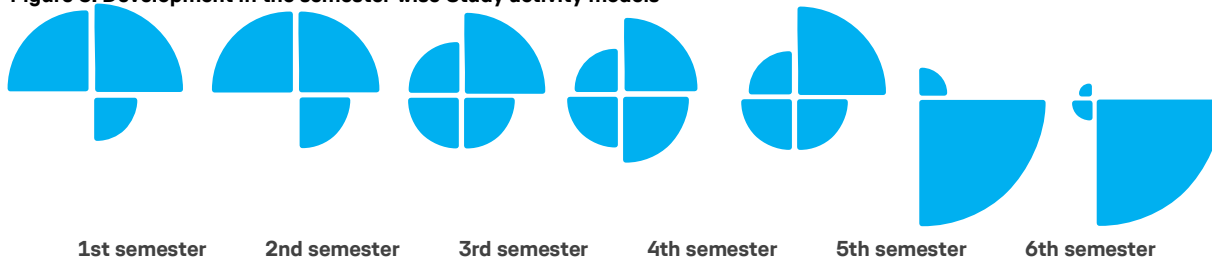


Source: Development at VIA Built Environment

The percentage distribution of hours in the four categories is an expression of the degree of independence we expect of you as a student.

If we look at the development in the semester wise Study activity models it follows the development in the pedagogical learning environment.

Figure 3: Development in the semester wise Study activity models



Source: Development at VIA Built Environment

All Study activity models can be found on the study programme's [website](#).

### 1.2.1 Individual learning offers

In addition to the scheduled and teacher-organized learning, you have many options of seeking new knowledge on your own. You can make use of the various offers of online teaching made available to you on 'Studynet' at this address: [www.Openvia.dk](http://www.Openvia.dk). In this database, you can find numerous instructional videos and tutorials, which may support your individual learning. You may also find material that can support you in the use of certain it-tools or material that offers repetition of specific academic topics.

You are expected to make use these offers as a supplement to your own learning-process, and you are also expected to seek knowledge through other relevant services (such as the library).

In case you have additional need for special assistance during the programme, there are a number of individual possibilities at the different campuses, e.g. assistance in math, it, language or the like. The assistance may be offered in the form of short, specially organized courses or it could be assistance from a student in one of the higher semesters.

In case you have special needs in relation to your learning, it is your responsibility to make your teachers or the student counselors aware of such needs. In each case, the programme management assesses the possibilities of offering special assistance.

In order to be able to offer you optimal conditions for your studies, it is important that you inform the college about special study or learning needs that you may have.

### 1.3 Study activity / Attendance

As described in the Study Activity Model, you are expected to participate actively in classes, project work and guidance meetings. In other words, we expect that you:

- attend to class well prepared
- take part in discussions and exercises in class
- contribute positively to the group work
- procure literature, recommended by your teachers and/or counselors
- hand in compulsory assignments
- attend to meetings related to your education (status meetings, guidance meetings, evaluations, etc.) well prepared and motivated, and that you are able to document and demonstrate that you have reached the set goals

## 1.4 Quality assurance and development of the programme

We work systematically and goal-oriented with quality assurance and development of the study programmes at VIA Built Environment with regards to ensuring your learning and the content of the study programmes. This includes ensuring an updated knowledge base, the right academic level and the study programmes' relevance for the employers.

### 1.4.1 Your involvement

You and your fellow students play an important part in assuring and developing the quality of the study programme. It is important for the programme management and the teachers to get your feedback, partly to ensure that you and your fellow students gain a high learning outcome, partly to ensure a satisfactory study- and teaching environment.

From the table below, you can get an overview of how you as students are involved in evaluating the courses at and outside of VIA, who primarily uses your feedback and when the evaluations are carried out.

**Table 1: The students involvement in evaluation of the courses at and outside of VIA**

Element	Method	Primary users	Time
Alignment of expectation at the start of a new course at the institution	Dialogue at the Semester introduction with a starting point in the semester syllabus	Teachers and students	At the start of each semester.
Midterm teaching evaluation of a course at the institution	The Teacher team select a method	The teacher team	Approximately half way through the semester – is stated in the guiding time schedule.
Final teaching evaluation of a course at the institution	Online survey	The programme management and The teachers and the teacher team	Each semester is evaluated every 3rd time it is carried out. It will be stated in the guiding time schedule if the semester is to be evaluated.
Ongoing dialogue	Dialogue between the teachers, students and programme management, e.g. in the daily life or through the local DSR/KSR	Teachers and students	Continuously.
Quality assurance, incl. final evaluation of internship in Denmark and abroad	Among other things online survey	The programme management, internship coordinators and the international office	Each semester is evaluated every 3rd time it is carried out. It will be stated in the guiding time schedule if the semester is to be evaluated.
Quality assurance, incl. final evaluation of studies abroad	Among other things online survey	The programme management and the international office	By the end of each period of studies abroad.
Student satisfaction survey	Online survey	The programme management and VIAs upper management	Every 2nd year. It will be stated in the guiding time schedule if there is a Student Satisfaction survey in the given semester.

Source: Development at VIA Built Environment



You can find results, Key Performance Indicators and action plans on [Studynet \(Aarhus\)](#). Results from the latest evaluations are presented at the Semester introduction. Furthermore, your class representatives play an important part in passing on the main points from the DSR-meetings.

## **1.4.2 The local DSR (Student Council)**

At VIA there is one DSR at each campus with class representatives from all the study programmes, but there is also local DSR's at the study programmes.

The programme management at VIA Built Environment in Horsens, Aarhus and Holstebro respectively continuously involve the local DSR in a discussion of the work with quality assurance and development of the programme, including:

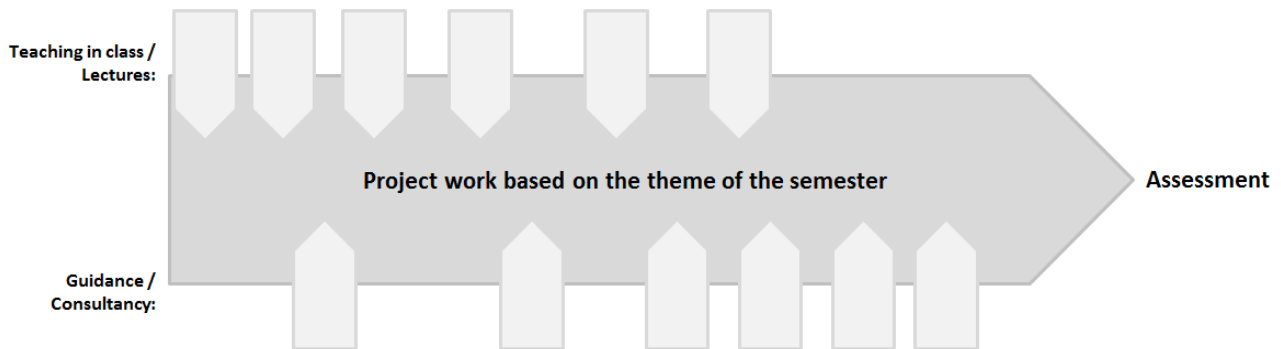
- Employer involvement
- Graduate involvement
- Final Teaching Evaluation
- Final Evaluation of the Internship in Denmark and abroad
- Final Evaluation of Study Abroad
- The Student Satisfaction Survey
- Drop-out analysis
- The Quality Report

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## 2 THE SEMESTER

During this semester, your studies will evolve around one continuous project in agreement with the overall semester theme. Figure 4 illustrates how single subject inputs support the project work. Theoretical inputs are often concentrated at the beginning of the semester, whereas guidance and consultancies in relation to the project are offered later in the semester. It is in the process towards solving problems that you demonstrate your development of competencies in order to become an AP Graduate in Construction Technology or a Bachelor of Architectural Technology and Construction Management.

Figure 4: Cross- disciplinary project work



Source: Created at VIA Built Environment

In the elective programme element you get the opportunity to specialize. The elective programme element is an independent course of study during this semester.

### 2.1 Entrance requirements

In order to be admitted to the 4<sup>th</sup> semester, you must have been registered for the exam in the 3<sup>rd</sup> semester, or be able to document that you in other ways have equivalent competencies.

### 2.2 Learning aims for the 4th semester (transcribed from the curriculum)

In this section the learning aims for the compulsory part of the semester (25 ECTS-points) are described. The learning aims are transcribed from [the curriculum](#).

#### Knowledge

At the end of the 4<sup>th</sup> semester, you should have learned:

- about and have the ability to reflect on the design of constructions, planning and management tools, technical installations, static principles, and documentation dealing with multi-storey residential buildings with commercial units
- about and understanding of general production and construction methods for multi-storey buildings with dwellings and commercial units, and the ability to reflect on these
- about general communication methods, tools and standards when designing multi-storey buildings with dwelling and business units

#### Skills

At the end of the 4<sup>th</sup> semester, you should:

- have the ability to use professional methods in the design of multi-storey buildings with dwellings and commercial units and use appropriate methods for planning the actual construction
- have the ability to assess different methods and approaches and be able to make an informed choice
- have the ability to convey the chosen methods and technical solutions to relevant collaboration partners

## Competencies

At the end of the 4<sup>th</sup> semester, you should:

- have the ability to carry out appropriate analyses and documentation materials used for the execution of multi-storey buildings with dwellings and commercial units
- have the ability to manage and implement the design and production process of a multi-storey building with dwellings and commercial units, taking into account the prevailing social and technological circumstances.

## 2.3 The project work

The project work is partly carried out as individual assignments and partly as assignments that need to be solved in groups of 2-4 students.

The work is carried out in groups, partly because this work form is commonly used within the building industry, and partly because you learn a lot when you have to collaborate problem oriented on a project with other students with different experiences.

Irrespective of the group work, it is important that you as an individual are able to acquire and put into use the knowledge you have obtained during single-subject teaching.

### Introduction

In groups, you undertake an investigation / registration of a modern multi-story dwelling. The research is documented in a report. This assignment serves as an introduction to, and inspiration for, the project work to be undertaken during the semester.

In addition, an architectural guided tour visiting modern multi-storey dwellings may be arranged.

### The case

The starting point of the case is a client (a housing association) inviting tenders to bid on a turnkey contract (all inclusive) on a multi-storey residential building with a commercial unit. See section **Fejll Henvisningskilde ikke fundet.** for further information.

Compared to previous semesters, the project work on the 4<sup>th</sup> semester is slightly different. Everyone gets the same case throughout the semester, but in the elective element you can choose to focus on different themes within design or implementation, respectively.

### The Outline Proposal

Based on the 'client's brief' and the overall plot plan, you are (in groups) requested to carry out such analyses and sketches as required in order to present an Outline Proposal containing all aspects related to arrangement/layout, costing, planning and legislation.

You present the proposal to the client (your lecturers and possibly external professionals) as a turnkey project in competition with the other groups in your class.

During the competition all proposals will be individually assessed and graded.

### The Scheme Design

During the ongoing work, there will be an opportunity to work in depth with aspects related to construction technology, building design as well as project implementation.

The project is developed from the Outline Proposal towards Detail Design 1 and Detail Design 2. You will put special emphasis on such elements as stairs, balconies, wet rooms and installation shafts.

In addition you must develop the planning and execution of excavation/earthwork, sewer and concrete work or similar works. This work is carried out by the turnkey contractor as own production.

Each group is responsible for its own planning and final distribution of tasks among group members.

At the examination, it is therefore important that the group starts by explaining how tasks and responsibilities have been distributed among group members.

## 2.3.1 Single-subject teaching

The single-subject teaching concerns rules, theories, methods and techniques within each specific academic field. The timely placement of each topic can be seen from the semester team own teaching plans, which will be available on Study net.

Table 2 show which single subject each main subject consists of. The topics are described separately in the following subsections.

**Table 2: Subjects and topics**

Main subject	Single subject	Duration
Building Design (BDS)	Architecture and Building Design (ABDS)	1 ECTS-point
	Building Design (BDS)	6 ECTS-points
	Material Science (BDS/MSC)	4 ECTS-points
Structural Design (STD)	Structural Design (STD)	2 ECTS-points
Building Services (BSE)	Building Services and Building Physics (BSE/BPHY)	2 ECTS-points
Building Planning and Management (BPM)	Building Planning and Management (BPM)	4 ECTS-points
Communication (COM)	Communication (COM)	1 ECTS-point
The Elective programme element	The Elective programme element	10 ECTS-points
	Philosophy of Science	
<b>Total duration of the semester:</b>		30 ECTS-points

Source: Created at VIA Built Environment

### 2.3.1.1 Building Design (BDS)

The learning aims and content of the subject is shown in the following subject boxes.

**Subject Box 1: Architecture and Building Design (ABDS)**

<b>Duration</b>	1 ECTS-point
<b>Learning aims - Knowledge</b>	You must gain knowledge about: <ul style="list-style-type: none"> <li>- methods and practice in relation to the theme of the semester</li> <li>- the history of multi-storey dwellings well as knowledge about the building tradition used in the same field</li> <li>- the industry's focus on sustainability and industrialization</li> <li>- low energy construction, including the influence of architectural design on energy consumption</li> </ul>
<b>Learning aims - Skills</b>	You must be able to: <ul style="list-style-type: none"> <li>- design multi-storey dwellings, including the ability to use sketching and analysis as tools to create rational plan solutions where form, function and architectural qualities are included - possibly based on existing solutions</li> </ul>
<b>Content</b>	<ul style="list-style-type: none"> <li>- introduction to the overall theme of the semester</li> <li>- investigation of the theme: Multi-storey buildings with dwellings and commercial units</li> <li>- sketching/analysis of state-of-the-art multi-storey buildings with dwellings and commercial units with balconies and penthouse - adapted to an urban context</li> <li>- sketching/analysis of plan solutions focusing on functional and architectural qualities as they are presented in Danish state-of-the-art residential buildings</li> <li>- Researching Danish and international architects who focus on sustainability and industrialization</li> <li>- Analogue and digital tools in sketching and communication of construction</li> </ul>

Source: Created at VIA Built Environment

**Subject Box 2: Building Design (BDS)**

<b>Duration</b>	6 ECTS-points
<b>Learning aims – Knowledge</b>	<p>You must gain knowledge about:</p> <ul style="list-style-type: none"> <li>- basic principles, as well as the application of methods and techniques used for the planning, designing and implementation of the proposal phases in a contemporary multi-storey building with dwellings and commercial units</li> <li>- usage of industrial building component and their relation to contemporary multi-storey buildings in relation to planning, implementation and designing</li> <li>- sustainable and low-energy multi-storey buildings, with particular focus on the design of building parts and details in addition to their influence on the energy consumption</li> </ul>
<b>Learning aims – Skills</b>	<p>You must be able to:</p> <ul style="list-style-type: none"> <li>- design and present your projects e.g. by using it</li> <li>- apply the methodology used in the elaboration of outline proposals (competition proposals) with a starting point in a given building program</li> <li>- control work methods for development of a project proposal with a problem statement, analyses, sketching, data retrieval etc.</li> <li>- assess and design details from an overall perspective</li> </ul>
<b>Content</b>	<ul style="list-style-type: none"> <li>- preliminary study of existing multi-storey buildings with dwellings and commercial units</li> <li>- reflection on building programs: quality, site conditions, supply, building form/ architecture, installations, room requirement, environment</li> <li>- Outline phase: 3D and freehand sketching, building control provisions, analyses, general understanding and presentation</li> <li>- Scheme Design phase: Design techniques and methods such as: Modular design, design using BIM tools, legal requirements, scrutinizing project, layout of constructions and installations, relevant building technique, prefabricated building components, material science</li> <li>- fire technical analyses</li> <li>- in the Detail Design 2 phase / contractor phase, a defined main project is carried out</li> <li>- analogue and digital tools in sketching and communication of construction</li> </ul>

Source: Created at VIA Built Environment

**Subject Box 3: Material Science (BDS/MSC)**

<b>Duration</b>	4 ECTS-points
<b>Learning aims – Knowledge</b>	<p>You must gain knowledge about:</p> <ul style="list-style-type: none"> <li>- the use of the building materials listed below in the construction of state of art multi-storey buildings with dwellings and commercial units - with emphasis on energy efficient, sustainable and industrialized products and components.</li> <li>- such aspects as composition, processing procedures, codes of standards, environmental aspects, protection, commercial availability, aspects related to construction, chemistry and life cycle assessment</li> <li>- how look at new building materials analytically</li> </ul>
<b>Learning aims – Skills</b>	<p>You must be able to:</p> <ul style="list-style-type: none"> <li>- preparation of a building component log</li> <li>- communicate material specifications based on your information model</li> <li>- preparation of material analyses for a number of chosen materials</li> <li>- analogue and digital tools in sketching and communication of construction</li> </ul>
<b>Content</b>	<ul style="list-style-type: none"> <li>- preparation of a building component log</li> <li>- preparation of material specifications on drawings</li> <li>- preparation of material analyses for a number of chosen materials</li> <li>- environmental considerations about material selection</li> <li>- visit a relevant company, a construction site or host a visit from a relevant company</li> </ul>

	<ul style="list-style-type: none"> <li>- work on selected parts of the specifications in Detail Design 2 / the contractor phase (in accordance with BIPS)</li> <li>- analogue and digital tools in sketching and communication of construction</li> </ul>
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Source: Created at VIA Built Environment

### 2.3.1.2 Structural Design (STD)

The learning aims and content of the subject is shown in the following subject box.

#### Subject Box 4: Structural Design and Mathematics (STD/MATH)

<b>Duration</b>	2 ECTS-points
<b>Learning aims - Knowledge</b>	<p>You must gain knowledge about:</p> <ul style="list-style-type: none"> <li>- important structural parts that act as overall stabilizing members in a multi-storey building in relation to material selection</li> <li>- all the relevant loads acting on a multi-storey building</li> <li>- rough calculations and the use of tabled values in relevant industrial-made concrete constructions</li> <li>- different types of foundation</li> <li>- different types of formwork</li> </ul>
<b>Learning aims - Skills</b>	<p>You must be able to:</p> <ul style="list-style-type: none"> <li>- understand and account for the use of one building system as compared to alternatives and be able to communicate this</li> <li>- account for all relevant loads acting on a multi-storey building and communicate the load bearing system and the path of the loads through the constructions</li> <li>- analyze and select the most suitable industrially produced load carrying structures, considering sustainability aspects with regard to manufacture and erection; all this based on the structural design</li> <li>- understand and use major geotechnical and geological terms</li> <li>- understand and solve problems that concern the joining of industrially manufactured staircase and balcony elements to 'the main structure'</li> <li>- apply appropriate characteristics in relation to statics demands in a BIM model</li> <li>- undertake collision and consistence control on drawing extracts</li> </ul>
<b>Content</b>	<ul style="list-style-type: none"> <li>- structural description of the applied building system including analysis of the load bearing and stabilizing system</li> <li>- dimensioning of different types of elements based on tabled information</li> <li>- rough calculation of in-situ cast concrete constructions</li> <li>- geology and soil mechanics</li> <li>- determine loads in accordance with current Eurocodes</li> <li>- structural documentation A1</li> </ul>

Source: Created at VIA Built Environment

### 2.3.1.3 Building Services (BSE)

The learning aims and content of the subject is shown in the following subject box.

#### Subject Box 5: Building Services and Building Physics (BSE/BPHY)

<b>Duration</b>	2 ECTS-points
<b>Learning aims - Knowledge</b>	<p>You must gain knowledge about:</p> <ul style="list-style-type: none"> <li>- the most important demands for technical installations and building physics in relation to the theme of the semester</li> <li>- the most important theories and principles applying to heat insulation, sound, moisture and installation pathways in multi-storey residential buildings</li> <li>- and understand the principles for energy frame calculations as well as the flexibility gained by using the energy frame</li> </ul>

<b>Learning aims – Skills</b>	<p>You must be able to:</p> <ul style="list-style-type: none"> <li>- carry out analyses and rough calculations, using relevant computer software within the field of building physics (see below)</li> <li>- make plans for the arrangement of building supplies and services based on analyses and rough calculations</li> <li>- arrange technical installations based on analyzes and rough estimates</li> </ul>
<b>Content</b>	<p>Building services/supplies</p> <ul style="list-style-type: none"> <li>- Supply mains (basic arrangement)</li> <li>- Installation ducts (regulations, demands, arrangement, dimensioning)</li> <li>- Ventilation (demands, analysis, rough calculation)</li> <li>- Sewer, drains, water and heating – rough calculation of sizes</li> <li>- Electricity: High voltage regulations, placement of switches and sockets, etc. (self-study)</li> <li>- Alternative energy: Solar heating systems, solar cells, soil heating, etc.</li> </ul> <p>Building physics</p> <ul style="list-style-type: none"> <li>- Energy Design – analysis of construction form</li> <li>- Energy frame – rough calculations at outline level, using the current BE15 or other relevant programs</li> <li>- Sound theory and analyses c.f. BR-requirements (reverberation, airborne sound and impact sound)</li> <li>- Calculation of reverberation</li> </ul>

Source: Created at VIA Built Environment

### 2.3.1.4 Building Planning and Management (BPM)

The learning aims and content of the subject is shown in the following subject boxes.

#### Subject Box 6: Building Planning and Management (BPM)

<b>Duration</b>	4 ECTS-points
<b>Learning aims – Knowledge</b>	<p>You must gain knowledge about:</p> <ul style="list-style-type: none"> <li>- demands for government subsidised housing and general, useful house building</li> <li>- tender procedures and contract forms - with special focus on the contract form used on the semester project: Turnkey contract and relevant contract award conditions</li> <li>- case organization and the parties involved incl. your own (design office) role in a turn-key contact context</li> <li>- the interrelationship between the authorities, the end users, the client, the turnkey contractor and the sub-contractors</li> <li>- the options in the BIM model for integration with calculation and management tools</li> <li>- the quality assurance of design work, including project scrutiny between design phases, c.f. DANSKE ARK 'Description of Services – Client'</li> <li>- overall principles for establishing a building site based on demands from PHS</li> <li>- methods for planning, implementation and management of construction works</li> </ul>
<b>Learning aims – Skills</b>	<p>You must be able to:</p> <ul style="list-style-type: none"> <li>- perform systematic data collection for the preparation of documented descriptions in relation to the case</li> <li>- describe and understand your own (the advisor's) and the main contractor's organization and conditions with regards to the overall project organization, with respect to the political environment, the authorities, the housing associations and the subcontractors</li> <li>- understand overall project budgeting using parts of the ABC-form applied in government subsidised construction work</li> <li>- follow up on independent work as well as group work and to use the planning as a basis for the fee calculation and registration of used time</li> <li>- carry out calculations, using the 'successive calculation principle' in the initial phase of the design work</li> </ul>

	<ul style="list-style-type: none"> <li>- design multi-storey residential/commercial buildings, within the framework applying to government subsidised housing</li> <li>- take off quantities in the independent project and use the quantities in cost calculation, based on building components in the last phase of the design work</li> <li>- make calculations regarding the overall financial situation, based on overall financial considerations</li> <li>- draft a building site arrangement plan</li> <li>- understand network process diagram planning and carry out an overall network diagram for the construction of a multi-storey residential building, and to transfer the information to a Gantt diagram</li> <li>- manage an plan construction work in the implementation phase</li> </ul>
<b>Content</b>	<p><b>General</b></p> <ul style="list-style-type: none"> <li>- project planning</li> <li>- fee calculation and registration of used time</li> <li>- government subsidised housing</li> <li>- successive calculation and building component calculation incl. taking off quantities</li> <li>- overall financial situation and overall financial assessment</li> <li>- network planning/Gantt-diagrams</li> <li>- building component log</li> <li>- construction phases and services rendered</li> <li>- tender procedures and contract forms</li> <li>- overall building site arrangement</li> <li>- project scrutiny and quality assurance</li> <li>- plan for health and safety</li> <li>- tender documents for sub-contractors</li> <li>- the ICT Agreement</li> </ul>

Source: Created at VIA Built Environment

### 2.3.1.5 Communication (COM)

The learning aims and content of the subject is shown in the following subject boxes.

#### Subject Box 7: Communication (COM)

<b>Duration</b>	1 ECTS-points
<b>Learning aims – Knowledge</b>	<p>You must gain knowledge about:</p> <ul style="list-style-type: none"> <li>- relevant communication theories and methods of communication including digital media</li> <li>- principles of philosophy of science and documentation</li> </ul>
<b>Learning aims – Skills</b>	<p>You must be able to:</p> <ul style="list-style-type: none"> <li>- communicate selected methods and technical solutions to relevant partners</li> <li>- analyze and understand communicative issues for interdisciplinary collaborations</li> </ul>
<b>Content</b>	<ul style="list-style-type: none"> <li>- possibly cooperate in IDP projects</li> <li>- communication of (competition) projects</li> <li>- possibly collaborate with international partners</li> <li>- information retrieval in databases</li> </ul>

Source: Created at VIA Built Environment

## 2.3.2 Other study elements

During the semester, the Semester team can plan other study elements, e.g. in corporation with the students. This will appear on the time schedule or the schema for each class.



## 2.4 The Elective programme element

The learning aims and content of the study module is shown in the following subject boxes.

### Subject Box 8: The Elective programme element

<b>Duration</b>	5 ECTS-points
<b>Learning aims - Knowledge</b>	You must gain knowledge about: <ul style="list-style-type: none"> <li>- See philosophy of science</li> </ul>
<b>Learning aims - Skills</b>	You must be able to: <ul style="list-style-type: none"> <li>- See philosophy of science</li> </ul>
<b>Content</b>	<ul style="list-style-type: none"> <li>- you must independently prepare a written report in relation to the theme of the semester following an independent and documented choice, as well as methodological and theoretical reflection. The report must be 15-20 standard pages (2400 entries incl. spacing, see the report guide). The report must be submitted in WiseFlow (see the time schedule)</li> </ul>

Source: Created at VIA Built Environment

### Subject Box 9: Philosophy of science (PS)

<b>Duration</b>	5 ECTS-points
<b>Learning aims - Knowledge</b>	You must gain knowledge about: <ul style="list-style-type: none"> <li>- how reports are included as part of the construction industry's work base</li> <li>- how to collect data, analyze and describe a concrete building-related topic so that it may form the basis for further processing</li> <li>- basic and relevant concepts within philosophy of science</li> </ul>
<b>Learning aims - Skills</b>	You must be able to: <ul style="list-style-type: none"> <li>- apply collected data on an analytical basis (based on philosophy of science) to confess a self-chosen building subject or solve a concrete building engineering task</li> <li>- write a report containing problem statement, collected data (empirical), analysis and interpretations, arguments and conclusion, and possibly a specific solution</li> <li>- argue for methods used in data collection, and use such data and be able to reflect upon their relevance in a given context</li> <li>- produce an academic, well-written report within the genre of philosophy of science</li> </ul>
<b>Content</b>	<ul style="list-style-type: none"> <li>- what is philosophy of science and in which way is it relevant within the profession (Architectural Technology and Construction Management)?</li> <li>- basic scientific concepts</li> <li>- how the writing of a report may be used as a research tool, as argumentation, and for the production of knowledge including: <ul style="list-style-type: none"> <li>- the basic scientific model and "pentagonen"</li> <li>- problem statement – What is a good problem statement?</li> <li>- research design – considerations concerning the analysis (how to do it)</li> <li>- methods used for data collection – (production of empirical data) including interview and observation techniques</li> <li>- data processing including systematization and interpretation of data – how?</li> <li>- writing a report</li> </ul> </li> </ul>

Source: Created at VIA Built Environment

## 2.5 Tests and evaluations

At the end of the semester, a final test is carried out. You and your group present the interprofessional project. Following, you will receive an individual assessment, partly for the group work and partly for the independent part of the project.

Only in case of lacking study activity or too large shortcomings in the prerequisites you will be guided to start the semester again, or in the worst case scenario, drop out of the programme.

Table 3 is an overview of the different study elements and their evaluation before or in relation to the final test.

**Table 3: Study elements and their assessment**

Study element	Evaluated before the final test	Evaluated in the final test
Exam 4: Project work in relation to 'Multi-storey buildings – with dwellings and commercial units'		X
Registration of existing building with dwellings and commercial units	X	
Exam 5: The elective programme element (report)	X	
Portfolio		X

Source: Created at VIA Built Environment

Find general information about the exam on [Studynet \(Aarhus\)](#).

## 2.5.1 Evaluation of the project

The assessment criteria are defined as:

- Method and process (knowledge, skills, competency)
- Technical solutions and documentation (knowledge, skills, competency)
- Oral presentation and defense (knowledge, skills, competency)

Essential parts of the project must be presented digitally / orally followed by oral examination by the teachers.

In the 4<sup>th</sup> semester emphasis is put on you using the knowledge and competencies you have already learned and seeking new knowledge to solve your semester project in a professional and analytical way.

When digital presentation is used at the ATCM-programme in relation to evaluation / the final test, we refer to the [current guide](#).

## 2.5.2 Evaluation of the elective programme element

The supervisor will assess and give you feedback in the form of a grade supplemented with an opinion given in a feedback sheet. In addition, a communication tutor may also be assigned to give a qualitative written assessment of the report form (structure, references etc.).

The overall assessment criteria used are:

- Problem statement – relevance and usefulness
- Choice of method and its application
- Professional (theoretical) argumentation
- Conclusion
- Form (Language, style, neatness, clarity, etc.)

The academic content and problem statement; the methodical approach and solution of the problem and formalities count equally with the ratio of 50/50.

In this context, the academic content refers to the complexity / degree of difficulty, whereas methodological reflections refer to the use of relevant methods and valid arguments.

### 3 TEACHER TEAM SPECIFICS

Case: refer file for the semester project in the studynet.

#### 3.1 Guiding time schedule

To the extent possible, the semester will proceed in accordance with the guiding time schedule presented in Figure 5. Figure 5: Guiding time schedule

Figure 6: Guiding time schedule

4sem INT S2018	Proposal and Price												Tender	Detail Design & Construction Management						Exam	
	EPE	Conceptual Proposal				EPE	Detail Design (Design Development level)				EPE	Architectural Technology Construction Management									
	6	7	8	9	10	11	12	13	14	15	16	17		18	19	20	21	22	23		24
Calendar week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Teaching week																					

Source: The semester team's creation

#### 3.2 References and knowledge base

##### 3.2.1 Cross-disciplinary references

- [ICT and BIM](#)
- Danish based references:
  - o Byggeskadefonden [www.bsf.dk](http://www.bsf.dk)
  - o BYG-ERFA, byggeteknisk erfaringsformidling [www.byg-erfa.dk](http://www.byg-erfa.dk)
  - o BIPS <http://bips.dk>
  - o Vejledende lærebogs- og kompendieliste F16: <https://studienet.via.dk/sites/uddannelse/bk/Horsens/vaerktoejer/Documents/bogliste-bk.pdf>

##### 3.2.2 Single-subject references

###### BD/BC

- [Vejledende lærebogs- og kompendieliste F18](#)

###### STD

- Teknisk Ståbi
- BR10, bilag 4, A1. Projektgrundlag og delvist A2. Statiske beregninger.
- Eurocode 0 (DS/EN 1990) with applicable Danish annex
- Eurocode 1 (DS/EN 1991) with applicable Danish annex
- Eurocode 2 (DS/EN 1992) with applicable Danish annex
- Eurocode 3 (DS/EN 1993) with applicable Danish annex
- Eurocode 5 (DS/EN 1995) with applicable Danish annex
- Eurocode 7 (DS/EN 1997) with applicable Danish annex
- 
- **BS**
- Indeklima og ventilation. Kompendium af Jens Peder Pedersen. Se Studienet>Faggrupper>TIN
- SBI-Anvisning 213, Vejledning til Be10

- DS 418, Beregning af bygningers varmetab
- DS 490, Lydklassifikation af boliger
- SBI\_Anvisning 185, Afløbsinstallationer

## LAW

- Mogens Hansen mfl.: AB 92 for praktikere
- Konkurrencestyrelsens vejledninger til udbudsreglerne: kfst.dk
- Niels Struer Kragelund: Byggejura, Erhvervsskolernes Forlag
- Litteraturforslag fra underviseren
- ABT 93, AB92, tilbudsloven, udvalgte dele af aftaleloven (alt kan findes på: [www.retsinfo.dk](http://www.retsinfo.dk))
- [www.klfu.dk](http://www.klfu.dk)
- [www.kfst.dk](http://www.kfst.dk)
- AB92 og ABT93 Kommenteret udgave v/Verner Markussen og Søren Fisker

## BPM

- [www.mbbi.dk](http://www.mbbi.dk) (ministeriet for by, bolig og landdistrikter)
- [Kvalitetsbekendtgørelsen www.retsinformation.dk](http://www.retsinformation.dk)
- [Ydelsesbeskrivelser for byggeriet \(2012\) www.frinet.dk](http://www.frinet.dk)
- [BEK nr. 1226 af 14.12.2011 om Støtte til almene boliger](#)
- [Bips beskrivelsesværktøjer](#) (via bibliotekets hjemmeside)
- [BBR Instruks](#)
- [Anlægsteknik 1 og 2](#)
- [www.arbejdstilsynet.dk](http://www.arbejdstilsynet.dk)
- Almenboligloven
- [www.byggeproces.dk](http://www.byggeproces.dk)

## Science theory

- Andersen, I. 2013, *Den skinbarlige virkelighed – vidensproduktion i samfundsvidenskaberne*, 5. udg., Forlaget Samfundslitteratur, Frederiksberg
- Stray Jørgensen, P. & Rienecker, L. 2011, *Studiehåndbogen*, Samfundslitteratur, København
- Stray Jørgensen, P., Rienecker, L. & Skov, S. 2011, *Specielt om specialer – en aktivitetsbog*, 4. udg., Samfundslitteratur, Frederiksberg
- Thuren, T. 2006, *Videnskabsteori for begyndere*, Rosinante/Munksgaard, København
- Olesen, Anne-Grete 2010, *Rapportguide*