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# SEMESTER SYLLABUS **1ST SEMESTER** RESIDENTIAL BUILDINGS

Bachelor of Architectural Technology and Construction Management  
AP Degree programme in Construction Technology

VIA University College Horsens

2018

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# SEMESTER SYLLABUS

## Welcome to the Architectural Technology and Construction Management programme at VIA!

We sincerely hope you are going to enjoy your studies at VIA, whether it is for 2 years, becoming an AP Graduate in Construction Technology or for 3 ½ years becoming a Bachelor of Architectural Technology and Construction Management.

You will get to know a lot of new students and teachers, and you will probably experience that the teaching principles are different from what you are familiar with from previous.

The main learning approach is Problem Based Learning (PBL) based on specific projects - ranging from simple single-family houses to industrially produced buildings and more complex multi-storey buildings as well as refurbishments. You finish the last semester with a bachelor project of your own choice, e.g. in co-operation with a specific company or client.

You will learn how to plan and design a building project, i.e. how to plan and draw, and how to describe and manage the production of building projects as it is done in real life by consultants, building component manufacturers and entrepreneurs in the building industry.

During the course of programme you will learn much more about yourself and your preferred learning style, and you will gain new social, technical and theoretical competencies within different working fields in relation to construction.

Along the way, you may find one field, particularly interesting and you may want to further your qualifications within that specific field. You may achieve this through the elective programme elements on the 4<sup>th</sup> and the 5<sup>th</sup> semester where you can specialize. You may also specialize by choosing an internship and a bachelor project within your field of interest.

We encourage you to make use of the facilities made available to you in the form of teaching, physical and digital services, and not least, the social opportunities for good teamwork with other students and employees at the college.

### Quality assurance and development

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

- Final teaching evaluation 1<sup>st</sup> semester
- Student satisfaction survey

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

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>.

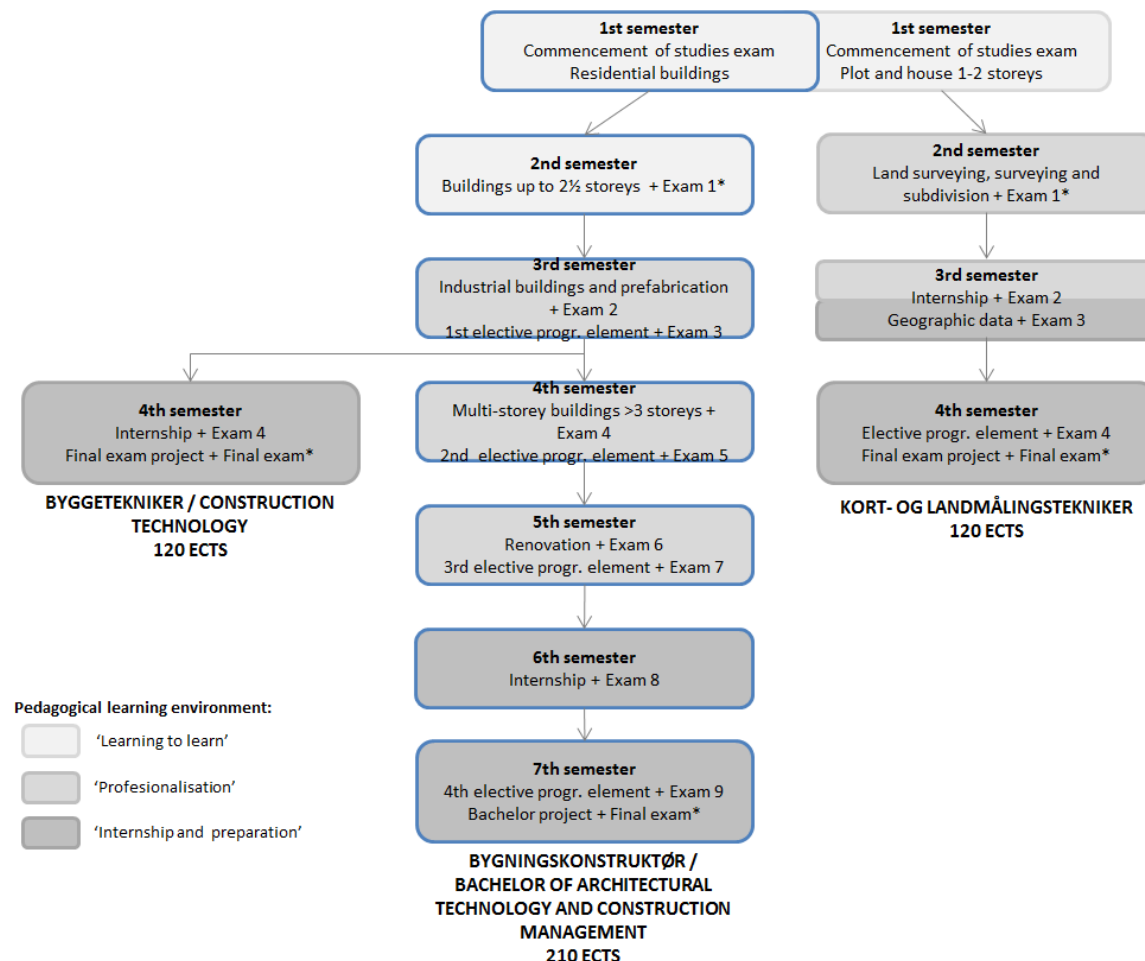
As a student, you have your own 'workplace' at the college, which we encourage you to use. The 'workplace' will change from semester to semester, depending on the size of the classes and your choice of specialization.

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

### "Learning to learn"

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

This environment emphasises 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 Problembased 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 develop and demonstrate 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.

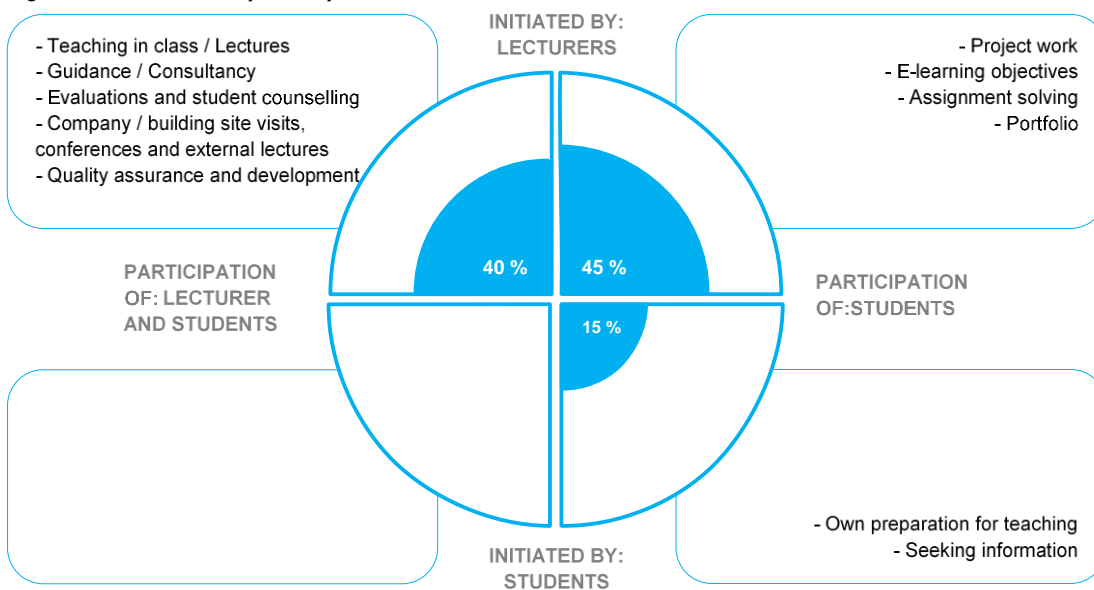
Portfolio is an important tool in the study programme, which you are to use to reflect upon your own learning.

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 spent 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**

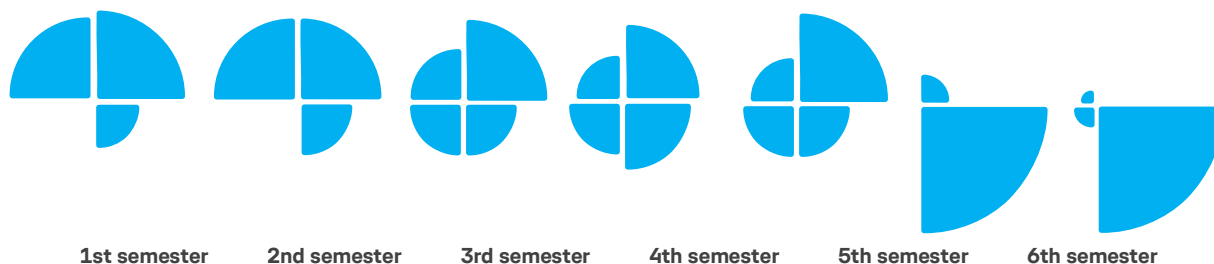


Source: Development at VIA Built Environment

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 \(Horsens\)](#). 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:

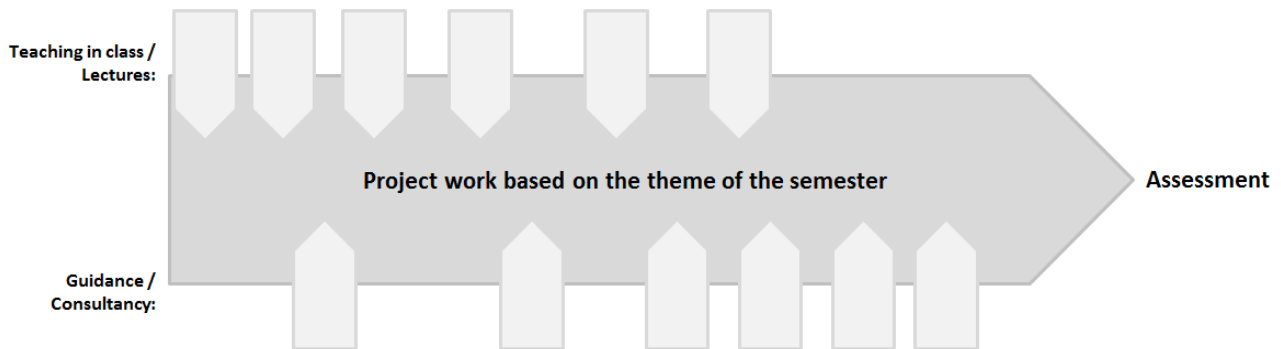
- Employer involvement
- Graduate involvement
- Final Teaching Evaluation
- Final Evaluation of the Internship in Denmark and abroad
- Final Evaluation of Study Abroad
- The Student Satisfaction Survey
- Drop-out analysis
- The Quality Report

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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

### 2.1 Entrance requirements

In order to be admitted to the 1<sup>st</sup> semester, you must meet the admission requirements defined in the Danish Ministerial order regarding admission to the Bachelor of Architectural Technology and Construction Management profession bachelor degree program.

### 2.2 Learning aims for the 1st semester (transcribed from the curriculum)

In this section the learning aims for the compulsory part of the semester (30 ECTS-points) are described. The learning aims are transcribed from [the curriculum](#).

#### Knowledge

By the end of the compulsory programme element, the student should have knowledge of:

- the correlation between the various professional issues in the semester theme
- relevant communication theories and methods to convey discipline-specific issues, including digital media within the theme of the compulsory programme element
- tools and standards in connection with the theme of the compulsory programme element
- the basic technical disciplines and related relevant documentation of the profession within the theme of the compulsory programme element
- general working methods in relation to theme of the compulsory programme element
- working methodology through methods and practice for use in planning, collaboration and learning
- methods and practice for use in planning, collaboration and learning
- general mathematical and physical construction principles of relevance to the profession
- basic static principles
- data collection and documentation in connection with project design tasks
- industry partners, professional areas and insight into the construction process in relation to the theme of the compulsory programme element
- applied principles, theories, methods and tools for project management of building and construction production in factories or on the construction site in relation to the theme of the compulsory programme element

## Skills

By the end of the compulsory programme element, the student should be able to:

- use methods and tools to collect and analyse information within the theme of the compulsory programme element
- convey practice-related technical issues related to the theme of the compulsory programme element to relevant partners and users
- relevant communication and methods to convey problems in production processes
- apply professional techniques in relation to the theme of the compulsory programme element and use methods for planning the building process
- structure their own and the work group's work at starter level
- assess setting-out tasks as well as understand and use site plans with contour lines and other map features used in the building and construction industry

## Competences

By the end of the compulsory programme element, the student should have the competences to:

- identify their own knowledge and learning needs based on the knowledge, skills and competences acquired in the course of the completed compulsory programme elements
- handle relevant construction and documentation material in relation to the theme of the compulsory programme element
- understand the correlation between the various professional issues in the theme of the compulsory programme elements
- take part in interdisciplinary collaboration on setting out in connection with building and construction tasks

## 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 of acquiring and applying the knowledge you have obtained during single-subject teaching.

During your work with the cross-disciplinary project for the 1<sup>st</sup> semester you will carry out analyses of building-technical problems and you will produce the documentation needed at a scheme design level for a single-family house in 1-2 storeys.

The project is designed as a BIM model in 2D and 3D.

### Outline Proposal

Based on a client's brief you (in groups) will be asked to sketch a proposal for a single-family house in 1-2 storeys. The house should have a size of approximately 160 m<sup>2</sup> without basement, but possibly with a garage. The house must be designed to fit into a specific plot assigned to the group.

The design work is carried out in 3D and presented on posters for approval by the client.

Supplementary documents and analyses are prepared for presentation through PowerPoint or similar programme.

The groups present results to 'the client' and to each other in class.

### Scheme Design

During this phase the groups will further develop an outline proposal up to scheme design level. The individual teams will 'work' with a new plot. The scheme design must document that the house can actually be constructed within the framework of current laws and regulations. The documentation will be in the form of analyses – certificates- details – plans – sections and elevations.

## Detail Design 1 and 2

It is not within the scope of the 1st semester theme to work out final Detail 1 and 2 material, but in order to develop the digital drawing skills, each student will further elaborate a given plan to the level required for 'authority approval' and 'work drawing' for construction.

### 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)	3 ECTS-points
Structural Design (STD)	Structural Design and Mathematics (STD/MATH)	2,5 ECTS-points
Building Services (BSE)	Building Services and Building Physics (BSE/BPHY)	2.5 ECTS-points
Building Planning and Management (BPM)	Building Planning and Management (BPM)	5 ECTS-points
Communication (COM)	Communication (COM)	5 ECTS-points
Registration (REG)	Land Surveying and Spatial Planning (SUR)	5 ECTS-points
<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>	<p>You must gain knowledge about:</p> <ul style="list-style-type: none"> <li>- the subject's knowledge base, its methods, and practice</li> <li>- recent architectural history with a focus on Danish housing construction on a smaller scale</li> <li>- fundamental architectural guidelines regarding the aesthetic setting</li> <li>- basic knowledge of sustainable architecture</li> </ul>
<b>Learning aims - Skills</b>	<p>You must be able to:</p> <ul style="list-style-type: none"> <li>- communicate the disposition of a residential building through analysis of the building's use</li> <li>- collect information and perform functional analyses in regards to the subject</li> <li>- achieve an understanding of drawings through the sketching process, free-hand drawing and 3D modeling</li> </ul>

<b>Content</b>	<ul style="list-style-type: none"> <li>- construction of the single-family house based on architecture and building design in relation to housing construction</li> <li>- Danish architectural history</li> <li>- architectural understanding</li> <li>- tools for planning, analysis and visualization at a basic level</li> <li>- sustainable architecture</li> </ul>
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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>- the subject in general, its methods and practice in connection with housing construction</li> <li>- holistic sustainable construction</li> <li>- contemporary building methods and building constructions</li> <li>- functional requirements for building constructions, including knowledge about Energy Efficient Sustainable Building Design and Construction</li> <li>- analogue and digital tools in the design and communication of the building design</li> </ul>
<b>Learning aims – Skills</b>	<p>You must be able to:</p> <ul style="list-style-type: none"> <li>- analyze and select building constructions for your project</li> <li>- achieve an understanding of drawings and constructions through sketching and 3D modelling</li> <li>- plan and develop a building from an existing proposal to a stage where it can be used as a basis for local authority approval</li> <li>- prepare documentation and to communicate information about the designed building using 2D/3D drawings – in writing and orally</li> </ul>
<b>Content</b>	<ul style="list-style-type: none"> <li>- layout of house on the plot including the distance regulations in the building code and provisions on oblique building lines</li> <li>- design methodology</li> <li>- sustainable conversion in the construction industry</li> <li>- building constructions and assembly details related to housing construction</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>	3 ECTS-points
<b>Learning aims – Knowledge</b>	<p>You must gain knowledge about:</p> <ul style="list-style-type: none"> <li>- the subject in general, its methods and practice</li> <li>- materials and their use in relation to the theme of the semester</li> <li>- the manufacture, processing and trading of materials</li> <li>- integration of materials into structures, their function and performance relative to application: Relevant properties, norm requirements, chemistry, environmental impact, certification schemes, life expectancy and recycling</li> <li>- the lifecycle term in relation to durability, maintenance and sustainability</li> </ul>
<b>Learning aims – Skills</b>	<p>You must be able to:</p> <ul style="list-style-type: none"> <li>- analyze and select building materials at a basic level</li> <li>- substantiate and document the selection of building materials based on their properties</li> </ul>
<b>Content</b>	<ul style="list-style-type: none"> <li>- Seeking knowledge, analysis and documentation within the subject in relation to the the theme of the semester</li> <li>- visit to a building material manufacturer and a building site.</li> </ul>

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>	2.5 ECTS-points
<b>Learning aims – Knowledge</b>	You must gain knowledge about: <ul style="list-style-type: none"><li>- units and concepts related to basic structural design and mathematics</li><li>- the structural systems and be able to identify these in a single family house of 1-2 floors</li><li>- Different types of load bearing structures and materials as well as their functions in small buildings</li></ul>
<b>Learning aims – Skills</b>	You must be able to: <ul style="list-style-type: none"><li>- account for stability, load types and the static system for a smaller housing development</li></ul>
<b>Content</b>	<ul style="list-style-type: none"><li>- Basic units, density, weight and specific gravity</li><li>- Action, reaction, dissolving and joining of forces and their direction</li><li>- Load bearing and bracing main system</li><li>- Supports, anchoring, and ceiling diaphragms</li><li>- Types of supports and loads</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>	2.5 ECTS-points
<b>Learning aims – Knowledge</b>	You must gain knowledge about: <ul style="list-style-type: none"><li>- different types of supply lines and their location on the plot in relation to the building, the boundary line and requirements for different laying depths</li><li>- different heating systems used in a single-family house</li><li>- different types of ventilation used in a single-family house</li><li>- different types of drainage pipes used inside the building and sewer, rainwater and drain pipes used in the ground (on the plot) and the connection to the main sewer system</li><li>- various installations for water, heating, electricity and communication</li></ul>
<b>Learning aims – Skills</b>	You must be able to: <ul style="list-style-type: none"><li>- arrange a plot and house plan in relation to supply lines and service pipes</li><li>- perform analyses for ventilation in accordance with the current Building Regulations</li><li>- perform analyses and estimates for heating systems</li><li>- plan technical installations on the basis of analyses and estimates</li><li>- calculate U-values of some standard constructions</li></ul>
<b>Content</b>	<ul style="list-style-type: none"><li>- Supply lines on the plot</li><li>- requirements, materials, laying depths and laying conditions for the different supply lines</li><li>- principles and supply pathways for water, heat, ventilation, communication lines and electrical installations</li><li>- energy guidelines on energy-efficient construction</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 box.

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

<b>Duration</b>	5 ECTS-points
<b>Learning aims – Knowledge</b>	<p>You must gain knowledge about:</p> <ul style="list-style-type: none"> <li>- methods for effective study planning</li> <li>- the planning and management of design work</li> <li>- basic principles used in the planning of implementation</li> <li>- methods for estimating building costs</li> <li>- methods and principles for quality assurance</li> <li>- project organizations and the various parties involved – including, the design phases and forms of contracts</li> <li>- basic principles used for the filing and management of digital documents</li> <li>- the structure and content of a building component log</li> <li>- Planning, local plans, easements, and registration</li> </ul>
<b>Learning aims – Skills</b>	<p>You must be able to:</p> <ul style="list-style-type: none"> <li>- plan the course of the semester logically</li> <li>- illustrate the building process in relation to the theme of this semester with consideration to the various parties involved</li> <li>- apply current planning methods involved when designing a single-family house</li> <li>- communicate the planning and implementation to the various parts involved</li> <li>- analyze the implementation and interdependency of the various building activities involved in the building of a single-family house – using a network diagram and the Gantt-charts</li> <li>- define (take-off) quantities and prepare cost estimates using m2-costs and costs of building components using digital tools</li> <li>- set up a budget based on rough calculation for the various parties involved – including the client (building owner)</li> <li>- use a filing management system for your project as a group</li> <li>- use a building component log as documentation for all decisions relevant to the project</li> </ul>
<b>Content</b>	<ul style="list-style-type: none"> <li>- resource management (group and personal planning)</li> <li>- group collaboration (team contract)</li> <li>- phases and services of the building process</li> <li>- journalisation of building components</li> <li>- quality assurance</li> <li>- work environment (considerations regarding the building site)</li> <li>- network planning</li> <li>- implementation schedule</li> <li>- calculation and quantity selection</li> <li>- forms of contracts and tendering</li> <li>- tools: Spreadsheet - use of formulas in spreadsheets</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 box.

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

<b>Duration</b>	5 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 for disseminating building-related issues, including the use of digital media within the subject of the compulsory programme element</li> <li>- building the communication structure in a digital presentation</li> <li>- group collaboration and methods for self-assessment and learning in groups</li> <li>- the importance of the agenda and the minutes and their structure</li> <li>- the composition of reports focusing on problem definition, structure and data collection</li> </ul>

<b>Learning aims – Skills</b>	<p>You must be able to:</p> <ul style="list-style-type: none"> <li>- present practical and academic subjects orally and in writing</li> <li>- develop a problem definition and based on this a report structure</li> <li>- collect data by using methodological principles</li> <li>- develop the skill til collaborate with other students</li> <li>- both orally and in writing – reflect upon your own learning, including your collaboration with others</li> <li>- prepare an agenda and write a report as a documentation of the work and phase in the group</li> <li>- use study techniques relevant to PBL</li> </ul>
<b>Content</b>	<p>Learning/study technique and collaboration</p> <p>Portfolio - including:</p> <ul style="list-style-type: none"> <li>- Self-reflection and reflection on subjects (learning aims, self-evaluation and knowledge sharing)</li> <li>- Documentation of learning styles, counselling meetings, team contracts, Project meetings</li> <li>- An introduction to group organized work</li> </ul> <p>Study techniques, including:</p> <ul style="list-style-type: none"> <li>- Information retrieval</li> <li>- Reading and note-taking techniques</li> <li>- Relevant study methodological tools for the above, for example, but not necessarily, Mind Map, one note ...</li> </ul> <p>Communication:</p> <ul style="list-style-type: none"> <li>- oral and written - including electronic - presentation techniques for evaluations and examinations</li> <li>- Preparing a call for a meeting. Writing decision and narrative minutes of meetings focusing on group work</li> <li>- Writing reports – intro focusing on problem definition, structure and data collection</li> </ul>

Source: Created at VIA Built Environment

### 2.3.1.6 Registration (REG)

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

#### Subject box 8: Land Surveying and Spatial Planning (SUR)

<b>Duration</b>	5 ECTS-points
<b>Learning aims – Knowledge</b>	<p>You must gain knowledge about:</p> <ul style="list-style-type: none"> <li>- the principles, theories, methods and tools used in land surveying and marking in relation to the field of construction</li> <li>- the instruments used for land surveying and marking of buildings, and the accuracy achieved by land surveying</li> </ul>
<b>Learning aims – Skills</b>	<p>You must be able to:</p> <ul style="list-style-type: none"> <li>- evaluate marking assignments, understand and apply site plans with contour lines and other maps used in the construction industry</li> <li>- register and assess the state of building components, facilities, and buildings</li> <li>- evaluate practical and theoretical issues, as well as justify the choice of relevant solutions</li> <li>- Communicate practical and professional issues, as well as solutions for partners and users</li> </ul>



<b>Content</b>	Documentation of the legality of the construction: <ul style="list-style-type: none"> <li>- levelling and levels (including applied mathematics)</li> <li>- registration of construction site</li> <li>- 3D landscape plan</li> <li>- site plans</li> <li>- contour plans</li> <li>- building position methods</li> <li>- process from point cloud to 3D model</li> <li>- process from topographic cards to Revit</li> </ul>
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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 Tests and evaluations

At the end of the semester, an internal 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.

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

Table 3: Study elements and their assessment

Study element	Assessed before the internal evaluation	Assessed in the internal evaluation
The work with the project in relation to 'Residential buildings'		X
Reports	X	
Portfolio (or similar self-reflection)	X	X
Land Surveying and Spatial Planning report	X	

Source: Created at VIA Built Environment

Find general information about the exam on [Study net \(Horsens\)](#).

## 2.5 Study start test

To ensure that you as a student is study active and to introduce some tools for ongoing self-reflection in relation to your learning a Study start Test is carried out approximately 2 - 6 weeks after the Study start. The test consists of 2 parts: a written questionnaire and a dialogue with one or more of your teachers. Based on the written reply and the dialogue, the teachers assess whether you "have passed" or "have not passed". If you don't pass, a new test is carried out after additionally 2 weeks: You only have 2 attempts to pass the Study start test.

### 2.5.1 Evaluation of the work with 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.

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

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## 3 TEACHER TEAM SPECIFICS

### 3.1 Introductory Assignments

Aim:

- To help students to get to know each other; develop their community knowledge and value of the diversity in the class; develop social contacts and get used to their new learning environment.
- To help lecturers understand students' backgrounds.
- To help develop an understanding of the difference between being a 'pupil' at school and being a 'student' at profession bachelor degree level.
- To help students learn about the education and get an understanding of the work of a Bachelor of Architectural Technology and Construction Management.
- To help students learn basic sketching and drawing techniques.
- To help students plan and write their Learning Portfolio.
- To help students to learn to use the college's IT (Information Technology) network.

Contents / activities:

- 2 day 'semester start' - to help the students to get acquainted.
- 'My House at Home' Sketch and document where you live/cultural background
- A visit to a building hardware store/timber merchant/library/material science lab - after which student groups prepare posters about various building components and materials.

Possible activities that could be included:

- A visit to a building product manufacturer.
- Contact with more experienced students – interviews, mentoring etc.
- A visit to a building site.
- Presentation of a 1<sup>st</sup> semester final project by 2<sup>nd</sup> semester students.

### 3.2 Practical group work

Aim

- That you learn to develop and optimise effective team working.
- That you learn to understand and value the diversity in the class and develop a L2L 'community of educational practice'.
- That you understand and practice the concepts "sharing knowledge"; accountability for your own learning and shared responsibility for shared learning.
- That you learn about the important role facilitation/consultation meetings have in your education - how to prepare for them, document them, and learn from them.

Contents – methods

- Introduction to team working theories and models within a PBL learning environment.
- Practical exercises and profiling tests for inclusion in your Portfolio.
- Cultural diversity in learning values and practice.
- Learning styles.
- Knowledge sharing – documented examples of student portfolios.
- Forming and profiling groups for Outline Proposal
- Preparation for facilitator meetings / reflection / self-coaching
- Portfolio: Documentation of group/ team and individual learning profiles should be included in your Portfolio and used in your facilitation meetings

Group syllabus exercise – 'What we have to do in the 1<sup>st</sup> semester'

- Groups read the 1st semester Syllabus, then analyse, discuss, and prepare a poster that illustrates what they have to do in the 1st semester.
- Each group then presents their poster to the class.
- Each student prepares 1 minute video presentation explaining their own understanding and expectations in relation to 1<sup>st</sup> semester.

### 3.3 'My house at home'

Aim: This assignment is designed to help you:

- develop basic competencies in SketchUp and PowerPoint programs
- develop your presentation skills
- gain deeper insights into the diversity within the class

Contents / activities

- Each student prepares a plan and 'model' – using SketchUp - of their house or flat.
- Each student makes a PowerPoint presentation of their plan, SketchUp model - including any photographs of their family / house - for the rest of the class.
- Professional feedback from the teachers including comments on your presentation skills.

### 3.4 Illustration techniques

Aim: This assignment is designed to help you:

- learn basic skills in using SketchUp as a professional 3D drawing program
- learn basic isometric drawing techniques so that you can make a quick pencil sketch to visualize various problems - possibly on the basis of a SketchUp model

Contents – activities:

- Basic rules for: Drawing formats, scaling, text and dimensions / measurements on drawings, title box, hatching and line sizes.
- Three-dimensional isometric and axonometric drawings.

Working methods:

- Lectures and individual / group assignments. Duration - 1 week

### 3.5 Outline proposal

Group work

- Describe your client (it is a family)  
Whatever client you describe you are informed that he/she has set up the following demands concerning the house and the materials to be used:
  - o External and internal walls are all brick walls
  - o Roof type is pitched roof clad with roof tiles
  - o Heating system based on natural gas from the grid
  - o The house must be placed in such a way that maximum consideration is given to sun and view(s)
  - o There shall be minimum two parking places for cars on the plot.
- Define the rooms required for your client- try also to compare the listed requirements with some of the houses from the historic overview ('Architecture – history and inspiration') in order to see if the requirements "fit in" with some of the plans presented.
- Make analyses concerning room connections, zoning and room sizes (it will be necessary to

study requirements in BR 2010, section 3 on dwellings in particular). Concerning room sizes – try also to look in “space requirements” and “Architects data”. The maximum *built up area* of your house is 150 m<sup>2</sup>.

- Try to determine the ideal orientation of the plan (in relation to the sun)
- Make sketches of the plan (scale 1:100) you would like to work with during the remaining part of the Outline Proposal (weeks 11-14).

NOTICE: All the above exercises will be carried out as hand sketches and notes on A3 and A4 paper formats (Poster 1).

When the group members have finished these small posters, the group swaps posters with another group (you will receive more information on this procedure later). As a group, it is now your job to determine which proposal you consider will best fulfil the requirements defined in the assignment. Your group actually acts as client –proposing possible changes/improvements. Once you have decided which proposal you have chosen including proposals for improvements, you report back to the “owners” of the proposal who in turn will finish the Outline as a group assignment, i.e. completing analyses with respect to structural stability, services etc.

The group organizes any additional information. In this connection additional information includes sketches, proposals for technical installations (sewer, water, etc.). You should also establish a Project File containing information concerning materials used in your proposed building (could be in the form of manufacturer/supplier information).

Sketches, analyses and other proposals should be mounted on separate sheet of paper – later we will scan them for digital presentation (Power Point).

Once all analyses have been completed, the group makes a new poster (Poster 3) including:

- Different perspectives of your house model (interior and exterior)
- Finished plans with furnished rooms – indicating room sizes (1:100)
- Elevations showing all facades and gables (1:100)
- A cross section through the building (1:100)
- Site plan – orientation, access, distances etc. (1:200)
- Time schedule showing design and construction phases
- Estimated total cost (based on average m<sup>2</sup>prices)

Analyses and poster will be presented to class by the end of week 14.

### 3.6 Scheme Design

The finished Outline proposal is the first part of the sketching phase. The Scheme Design is the second part (final part) of the sketching phase. The Scheme Design (once approved by the client) forms the basis for the following Detail Design phases, which include Detail Design I and II, Specifications, Bill's of quantities and any other tender documents.

A typical Scheme Design includes building component drawings, details, sections, isometric details and plans. The drawings are still considered as proposals and analyses, but drawn with high degree of accuracy.

One could say that the Scheme Design has to solve all major problems in the building, to avoid any surprises later on in the designing process.

Furthermore, the client expects to receive proposals for the finish of all internal and external surfaces. He is also entitled to receive an updated cost estimate based on the cost of the construction principles applied as well as the materials chosen. Lastly the client also expects to get an overall time schedule for the construction period.

A proposal for working methodology could be as follows:

- Group and personal project planning - based on an analysis of scheme design activities

- Use copy of section and (possibly) plan from outline proposal and try to circle in the details you need to solve in order to secure the safe construction of a building that meets current requirements in accordance with building regulations, codes and standards (structure, energy consumption, moisture conditions etc.)
- On-going study of building regulations, codes and standards
- Functional requirements of building components (Building component analysis)
- Building component log
- Sketch 3D building component models before making plans and sections (SketchUp)
- The sketched 3D models are used to set up 2D drawings in scale 1:5 – supplied with dimensions and text describing elements and materials used (LayOut)
- Room drawings (kitchen/bath) (Revit)
- Plan scale 1: 50 (Revit model based on SketchUp file)
- Elevations 1:50 (Revit)
- Section scale 1: 20 (Revit and/or SketchUp)
- Site plan 1:200 (Revit or SketchUp)
- Structural analysis (SketchUp or Revit)
- Flow chart of the building process
- Time schedule / Construction planning
- Estimates
- Technical installations – shown on copies from your plan drawings
- Room “scheme”

### **3.7 Guiding time schedule**

The guiding time schedule will be published/handed out by your class teacher.

## 3.8 References and knowledge base

### 3.8.1 Cross-disciplinary references

- ICT and BIM

### 3.8.2 Single-subject references

(BDS)

- The Building Regulations 2015
- SBI 230 Guidelines on the Building Regulations 2010
- SBI 189 Constructions in small dwellings
- SBI Guidelines 233 Protection Against Radon in New Buildings
- Wood 41 - Wooden Floors
- Various handbooks and websites to be recommended by your lecturers for example:  
[www.digitalconstruction.dk](http://www.digitalconstruction.dk)  
E-learning(teachingmaterial)  
[www.students.autodesk.com](http://www.students.autodesk.com)  
[www.traecad.dk](http://www.traecad.dk)  
Introduction to Revit – Compendium [www.leca.dk](http://www.leca.dk)  
[www.hhcelcon.dk](http://www.hhcelcon.dk) [www.rockwool.dk](http://www.rockwool.dk) [www.bib-blokke.dk](http://www.bib-blokke.dk)

(BDS/MSC)

- Mike Riley + Chris Howard: House Construction - ISBN no 0-333-80456-2
- Barry: Introduction to construction of buildings – ISBN no 978-4051-1055-6
- Introduction to Architectural Technology – ISBN no 978 1 78067 294 6
- SBI-Guidelines189
- SBI-Guidelines230

(STD)

- The Building Regulations 2015
- Gitte Normann Bak: Structural Design manual 1.Semester
- SBI 230 Guidelines on the Building Regulations 2010
- SBI 189 Constructions in small dwellings)

(BSE/BPHY)

- BR 2015
- Danish Standards (DS 418)
- Sewer and drainage (compendium in Studynet)
- U-values/heat loss (compendium in Studynet)
- ‘Space requirements’ (compendium on Studynet)
- SBI Guidelines 185 – Sewer installations
- UPONOR VVS Handbook
- UPONOR Technical Handbook
- Ventilation and indoor climate (compendium on Studynet)

(BPM)

- File and document structure – Studynet

- Sfb coding system – Studynet
- E-learningMS-project
- Sigma (V&S Costing books)
- <http://www.bips.dk/Bips/Main/Mainpage.htm>

(COM)

- Honey and Mumford 2006 – Learning styles test (Studynet)
- Example of 1 semester portfolio
- Bruce Tuckmann – Developmental sequence in small groups 1965 – (Studynet)
- Blooms Taxonomy / SOLO approach Structured Observation of Learning Outcomes (John Biggs) (Studynet)
- Digital portfolio *wix.com*

(SUR)

- Local Plan no. 8, Horsens Municipal, 1984, Translated
- Local Plan no. 141, Horsens Municipal, 2000, Translated
- Building Regulations 2010, the Danish Ministry of Economic and Business Affairs, Danish Enterprise and Construction Authority, Copenhagen 12. of December 2010
- The Planning Act in Denmark, Consolidated Act No. 813 of 21 June 2007, MINISTRY OF THE ENVIRONMENT, October 2007