

National part

Applicable as per 1 February 2020

# Curriculum 2020

Architectural Technology and Construction  
Management

## Contents

1. The learning outcome goals for the study programme .....	1
2. The study programme contains 5 national subject elements.....	3
2.1. Residential construction (1 <sup>st</sup> semester).....	3
2.2. Low-rise construction of up to 2½ floors (2 <sup>nd</sup> semester).....	5
2.3 Industry and prefabrication (3 <sup>rd</sup> semester).....	7
2.4 High-rise construction of more than 3 floors (4 <sup>th</sup> semester).....	9
2.5 Renovation (5 <sup>th</sup> semester).....	11
2.6. Tests and exams in the national subject elements .....	12
3. Internship .....	13
4. Requirements for the bachelor project .....	14
5. Credit transfer rules.....	15
6. Commencement and transitional agreement .....	15

This national part of the curriculum for the programme Bachelor in Architectural Technology and Construction Management was issued in accordance with clause 18, sub-clause 1 in the Ministerial Order on Technical and Mercantile Academy Profession Programmes and Professional Bachelor Programmes (Danish title: Bekendtgørelsen om tekniske og merkantile erhvervsakademiuddannelser og professionsbacheloruddannelser). This curriculum is supplemented by the institutional part of the curriculum, adopted by the individual institutions offering the study programme.

It was prepared by the academic network for the programme Bachelor in Architectural Technology and Construction Management and the academy profession programmes for the AP Graduate in Construction Technology and approved by the board of all providers – or by the President as per authorisation – and after a hearing of the institutions’ committees and the censorship presidency of the programme.

# **1. The learning outcome goals for the study programme**

## **Knowledge**

The Bachelor in Architectural Technology and Construction Management will gain:

- Development-based knowledge and understanding of the principles, theories, and methods applied by the profession as regards management, project design, planning, completion as well as operation and maintenance of complex building and construction projects.
- Development-based knowledge of scientific theoretical concepts and methods relevant for the profession as well as communication theories and methods to communicate building-technical issues, including use of digital media and tools within the profession.
- Development-based knowledge of principles and models applied by the industry for the establishment, operation, and organisation of a business, and of societal and technological conditions that have an impact on the construction process, including issues within the areas of energy, working environment, and sustainability from a local and global perspective.
- Development-based knowledge of managerial, social, linguistic, cultural, and ethical aspects related to the planning of and cooperation on construction projects.

## **Skills**

The Bachelor in Architectural Technology and Construction Management will be able to:

- Assess and apply methods relevant for the profession with regard to management, project design, planning, and completion of complex building and construction projects, including relevant digital tools, standards, and systems.
- Apply relevant research knowledge and methods to solve complex building-technical problems.
- Assess technological, organisational, and societal factors in connection with the construction planning, including aspects as regards energy, working environment, and sustainability as well as to substantiate and choose relevant solutions.
- Communicate practice-oriented and professional knowledge based on building-technical research and development.

## **Competencies**

The Bachelor in Architectural Technology and Construction Management will be able to:

- Manage the planning, project design, management, and completion of complex building and/or construction projects – independently and in cooperation with other professionals.
- Manage the communication between the parties involved in the construction project about the project design, tendering, and completion of complex building and construction projects.

- Manage sustainable, social, cultural, and ethical factors as regards the design and processing of construction projects as well as to participate in managerial and cooperative contexts with other professionals with different educational, linguistic, and cultural backgrounds.
- Independently participate in professional and cross-disciplinary projects and assume responsibility within the framework of the profession.
- Identify its own learning needs and to develop its own knowledge, skills, and competencies in relation to the profession.

## **2. The study programme contains 5 national subject elements**

### **2.1. Residential construction (1<sup>st</sup> semester)**

#### **Contents**

The national subject element is completed by a cross-disciplinary project based on a specific, minor residential construction project.

The subject element comprises 30 ECTS and includes the following subject areas:

Communication and cooperation (10 ECTS)

Production (5 ECTS)

Project Design (15 ECTS)

#### **Learning objectives for Residential construction**

##### **Knowledge**

In relation to the national subject element *Residential construction* the student must:

- Be able to understand the basic building-technical disciplines of the profession and the associated relevant documentation.
- Be able to understand basic methods for project design and building methods, including understanding of materials, construction principles, social, environmental, and financial aspects.
- Have knowledge of common communication methods, analogue and digital tools and standards.
- Have knowledge of the parties of the industry, professional areas, and insight into the construction process.
- Have knowledge of basic, applied mathematical and structural principles, including technical installations and statics.
- Have knowledge of methods for information search in connection with project design tasks.
- Have knowledge of principles and tools applied within land surveying, setting out, and registration in the building and construction area.

##### **Skills**

In relation to the national subject element *Residential construction* the student must be able to:

- Apply methods and tools to collect and analyse information at a basic level.
- Apply project design methods and tools as well as to apply methods for the coordination of the construction process.
- Apply methods and tools for land surveying and setting out buildings.
- Apply methods and tools for the organisation and planning of professional cooperation.

- Communicate practice-oriented and professional issues to relevant business partners.
- Assess practice-oriented and theoretical issues as well as to substantiate and choose relevant solutions.

### **Competencies**

In relation to the national subject element *Residential construction* the student must be able to:

- Manage construction solutions and documentation at a basic level.
- Manage the connection between different building-technical issues.
- Participate in a professional and cross-disciplinary cooperation in study-related contexts.
- Address its own learning needs in a structured context.

### **Scope of ECTS**

The national subject element *Residential construction* counts for 30 ECTS credits.

## **2.2. Low-rise construction of up to 2½ floors (2<sup>nd</sup> semester)**

The national subject element is completed by a cross-disciplinary project based on a specific construction not exceeding 2½ floors.

The subject element comprises 30 ECTS and includes the following subject areas:

Company (5 ECTS)

Communication and cooperation (5 ECTS)

Production (10 ECTS)

Project Design (10 ECTS)

### **Learning objectives for Low-rise construction of up to 2½ floors**

#### **Knowledge**

In relation to the national subject element *Low-rise construction of up to 2½ floors* the student must:

- Be able to understand and reflect on common constructions and building physics principles, including statics and technical installations.
- Have knowledge of common communication methods, analogue and digital tools and standards.
- Have knowledge of building information modelling (BIMs) in connection with project design and production.
- Have knowledge of theories, methods, and tools for financial management of the construction during the project design stage.
- Be able to understand and reflect on common methods for planning, project design, and completion as well as work methodology during the construction process.
- Have knowledge of basic social, environmental, and financial aspects in connection with project design and production.
- Have knowledge of laws, principles, and methods within companies, entrepreneurship, legal rules, and contractual matters.

#### **Skills**

In relation to the national subject element *Low-rise construction of up to 2½ floors* the student must be able to:

- Apply methods and tools for the collection and analysis of information.
- Apply methods and tools for quality assurance and financial management as regards project design and production.
- Apply methods, tools and standards, including the use of digital building information models (BIMs).
- Assess theoretical and practice-oriented issues in the project design and production of minor constructions and substantiate the chosen actions and solutions.

- Assess and choose tendering, contractual and organisational forms at a basic level.
- Communicate practice-oriented and professional issues and solutions to business partners and users.

### **Competencies**

In relation to the national subject element *Low-rise construction of up to 2½ floors* the student must be able to:

- Manage analyses of relevant technical issues in the construction project and the associated solutions.
- Manage the project design and account for the principles in the completion.
- Independently participate in the cooperation with other professionals as regards digital project planning.
- Identify its own learning needs based on the knowledge, skills, and competencies acquired during the semester.

### **Scope of ECTS**

The national subject element *Low-rise construction of up to 2½ floors* counts for 30 ECTS credits.

### **2.3 Industry and prefabrication (3<sup>rd</sup> semester)**

The national subject element is completed by a cross-disciplinary project based on the project design and production of industrialised components applied in a specific construction.

The subject element comprises 25 ECTS and includes the following subject areas:

Company (5 ECTS)

Communication and cooperation (5 ECTS)

Production (10 ECTS)

Project design (5 ECTS)

### **Learning objectives for Industry and prefabrication**

#### **Knowledge**

In relation to the national subject element *Industry and prefabrication* the student must:

- Be able to understand and reflect on common constructions and building physics principles, including statics and technical installations.
- Be able to understand and reflect on prefabricated methods for production and completion during the construction process, including planning and management tools.
- Be able to understand and reflect on forms of organisations, cooperation, and management in connection with project design and production.
- Have knowledge of social, environmental, financial, and technological aspects during the project design and production process.
- Have knowledge of basic principles, theories, and methods for the establishment and operation of a business.

#### **Skills**

In relation to the national subject element *Industry and prefabrication* the student must be able to:

- Apply methods and tools for the collection and analysis of information.
- Apply project design and production methods in relation to the construction process for prefabricated construction.
- Apply digital building information models (BIMs) as well as to transfer and extract data between different digital platforms and information systems.
- Assess and analyse theoretical and practice-oriented issues in a prefabricated construction as well as to substantiate the chosen actions and solutions.
- Assess basic contracts and forms as well as to coordinate the project procurement and tendering form.

- Communicate practice-oriented, professional issues and solutions to Danish- and English-speaking business partners and users.

## **Competencies**

In relation to the national subject element *Industry and prefabrication* the student must be able to:

- Manage documented analysis of relevant technical issues in the construction project.
- Manage construction solutions to optimise the production, in consideration of social, environmental, and financial aspects.
- Manage the handover of digital project and documentation materials as a basis for digital tendering.
- Independently participate in a professional and cross-disciplinary cooperation on the preparation of project materials.
- Participate in a cooperation on management of construction and building projects.
- Identify its own learning needs and acquire knowledge, skills, and competencies.

## **Scope of ECTS**

The national subject element *Industry and prefabrication* counts for 25 ECTS credits.

## **2.4 High-rise construction of more than 3 floors (4<sup>th</sup> semester)**

The national subject element is completed by a cross-disciplinary project based on a specific construction exceeding 3 floors.

The subject element comprises 15 ECTS and includes the following subject areas:

Communication and cooperation (5 ECTS)

Production (5 ECTS)

Project design (5 ECTS)

### **Learning objectives for High-rise construction of more than 3 floors**

#### **Knowledge**

In relation to the national subject element *High-rise construction of more than 3 floors* the student must:

- Be able to understand and reflect on complex constructions and building physics principles, including statics and technical installations.
- Have knowledge of common communication methods, tools, and standards in connection with digital project design as well as be able to reflect on digital systems and methods applied in the profession.
- Be able to understand and reflect on complex production and completion methods.
- Have knowledge of scientific theoretical principles and methods as regards the practice of the profession.
- Have knowledge of relevant social, environmental, financial, and technological aspects in the project planning and production process.

#### **Skills**

In relation to the national subject element *High-rise construction of more than 3 floors* the student must be able to:

- Apply and master methods and tools to collect, analyse, and process information.
- Apply methods for planning, coordination, and project design of a digital cross-disciplinary process, including considerations as regards completion, operation, and maintenance.
- Master the skills associated with the planning and management of the completion.
- Apply digital building information models (BIMs) as well as to transfer and extract data between different digital platforms and information systems.
- Communicate digital project and documentation materials as a basis for digital construction management.
- Communicate and assess practice-oriented and professional issues as well as to substantiate and choose solutions for business partners and users.

## **Competencies**

In relation to the national subject element *High-rise construction of more than 3 floors* the student must be able to:

- Manage documented analysis of complex and relevant building-technical issues.
- Manage complex digital project design and production in consideration of social, environmental, and financial aspects.
- Manage the project design and completion process in consideration of societal and technological conditions.
- Independently participate in a cross-disciplinary cooperation on planning, project design, and production of construction and building projects.
- Identify its own learning needs and develop its own knowledge, skills, and competencies.

## **Scope of ECTS**

The national subject element *High-rise construction of more than 3 floors* counts for 15 ECTS credits.

## **2.5 Renovation (5<sup>th</sup> semester)**

The national subject element results in a cross-disciplinary project based on planning and project design of a specific renovation.

The subject element comprises 15 ECTS and includes the following subject areas:

Production (5 ECTS)

Project design (10 ECTS)

### **Learning objectives for Renovation**

#### **Knowledge**

In relation to the national subject element *Renovation* the student must:

- Acquire development-based knowledge of the registration and assessment of existing conditions.
- Be able to reflect on constructions and building physics principles, including statics and technical installations.
- Be able to understand complex project design and completion methods.
- Be able to reflect on different energy-optimised renovation and re-modelling concepts, in consideration of social, environmental, and financial aspects.

#### **Skills**

In relation to the national subject element *Renovation* the student must be able to:

- Apply and master methods and tools to collect, analyse, and process information.
- Apply and master project design methods as well as methods to plan and manage the completion of the renovation project, in consideration of social, environmental, and financial aspects.
- Apply digital building information models (BIMs) as well as to transfer and extract data between different digital platforms and information systems.
- Assess building-technical issues and aspects as well as to make substantiated decisions.
- Communicate practice-oriented and professional issues and solutions to business partners and users.

## Competencies

In relation to the national subject element *Renovation* the student must be able to:

- Manage complex building-technical solutions based on documented analysis.
- Manage a digital project design and production process.
- Manage complex renovation projects in consideration of social, environmental, and financial aspects.
- Independently participate in a cross-disciplinary cooperation on planning, project design, quality assurance, and production of complex renovation projects.
- Identify its own learning needs and develop its own knowledge, skills, and competencies.

## Scope of ECTS

The national subject element *Renovation* counts for 15 ECTS credits.

### 2.6. Tests and exams in the national subject elements

The national subject elements during the 1<sup>st</sup> year of studies count for 60 ECTS credits, all included in the first year test.

Moreover, there are 3 tests (3<sup>rd</sup>, 4<sup>th</sup>, and 5<sup>th</sup> semester) in the other national subject elements plus one test in the bachelor project (7<sup>th</sup> semester). For tests during the internship (6<sup>th</sup> semester), please see section 3.

For a total overview of all tests during the study programme, we refer to the institutional part of the curriculum as the national subject elements described in this curriculum may be tested together with subject elements stipulated in the institutional part of the curriculum.

### **3. Internship**

#### **Learning objectives for the internship during the study programme**

##### **Knowledge**

The student will gain:

- Development-based knowledge of and be able to reflect on the practical work of the profession in the company in question.
- Development-based knowledge of and reflect on the organisational, financial, administrative, and social- and work-related conditions in the company in question.

##### **Skills**

The student must be able to:

- Apply and master methods and tools of a Bachelor of Architectural Technology and Construction in relation to the relevant profession.
- Assess theoretical and practice-oriented issues during the internship as well as to substantiate and choose relevant solutions.
- Communicate practice-oriented issues and solutions as regards the place of internship and stakeholders.

##### **Competencies**

The student must be able to:

- Manage and translate complex and development-based issues in work contexts into practice-oriented solutions in the company in question.
- Identify its own learning needs and develop its own knowledge, skills, and competencies in relation to the profession.
- Manage complex and development-based situations in work contexts.
- Independently participate in a professional and cross-disciplinary cooperation and assume responsibility within the framework of professional ethics.
- Work with professional and complex issues within the area of the profession in the company in question.
- Work independently or in cooperation with other professionals to solve theoretical and practical problems in the company in question.

##### **Scope of ECTS**

The internship counts for 30 ECTS credits.

##### **Tests and exams**

The internship is completed by one test.

## **4. Requirements for the bachelor project**

The learning objectives for the bachelor project are identical to the learning objectives of the study programme, as described above under section 1.

The bachelor project must document the student's understanding of and ability to reflect on the practice of the profession and central applied theories and methods as regards a practice-oriented issue. The issue must be essential to the study programme and the profession and formulated by the student, possibly in collaboration with a private or public company. The institution must approve the issue.

### **The bachelor project exam**

The bachelor project completes the study programme in the last semester when all previous tests have been passed. Basically, we refer to the current Ministerial Order on Exams in Professionally Oriented Higher Education Programmes (Danish title: Bekendtgørelse om prøver i erhvervsrettede videregående uddannelser) and to the institutional part of the curriculum.

### **Scope of ECTS**

The bachelor project counts for 20 ECTS credits.

### **Exam form**

The test is held as an oral and written test with external censorship. A total individual grade is given according to the 7-point grading scale for the written project and the oral presentation.

Moreover, reference is made to the institutional part of the curriculum for further requirements specifications.

## **5. Credit transfer rules**

Passed academic elements are equivalent to the corresponding academic elements at other educational institutions offering the study programme.

The student is required to inform any completed academic elements from another Danish or foreign higher education programme and occupation that can be considered as credit-awarding.

In each individual case, the educational institution must approve the awarding of credits on the basis of completed academic elements and occupation that meet the requirements as regards subjects, programme and internship parts.

The decision is based on a professional evaluation.

With the preliminary approval of a study visit in Denmark or abroad, the student must – after the completion of the study visit – document the academic elements completed during the approved study visit.

In connection with the preliminary approval, the student must give the institution its consent to collect necessary information after the completion of the study visit.

With the approval in accordance with the rules stated above, the academic element is considered as completed if it was passed in accordance with the rules for the study programme in question.

## **6. Commencement and transitional agreement**

All students enrolled will be transferred to this curriculum on 1 February 2020.

At the same time, the previous curriculum is cancelled.