

**Curriculum at LAB University of Applied Sciences  
2025-2026**

**Bachelor of Engineering, Sustainable Construction  
Technology 25S, full-time studies, Lahti**

Code	Name	1 y	2 y	3 y	4 y	ECTS total
<b>TLTISCT25S-1001 CORE COMPETENCE</b>						<b>225</b>
<b>TLTISCT25S-1002 Basics of Engineering I</b>						<b>33</b>
AT00DD74	Basics of Algebra	3				3
AT00CZ68	Digital Skills	3				3
A300CE13	Orientation to Sustainability Thinking	2				2
AT00DF80	Orientation to Construction Engineering	3				3
AT00CZ70	Basics of Building Engineering & AutoCAD	5				5
AT00CZ71	Developing Professional Competences I	1				1
AT00DD75	Geometry and Vectors	3				3
KE00CE75	English for Professional Communication	5				5
K200CE69	Finnish 1	3				3
K200CE70	Finnish 2	3				3
KE00DD58	Intercultural Competence	2				2
KS00DD59	Expert Communication Skills	5				5
<b>TLTISCT25S-1003 Basics of Engineering II</b>						<b>29</b>
AT00CZ73	Basics of BIM	5				5
AT00CZ74	Statics I	3				3
AT00DE97	Basic Physics	3				3
AT00DD76	Functions and Equations	3				3
AT00DF81	Strength of Materials	4				4
AT00CZ78	Concrete Technology	3				3
AT00CZ79	Building Materials	5				5
AT00CZ80	Developing Professional Competences II	1				1
K200DD57	Finnish for Technology	2				2
<b>TLTISCT25S-1004 Construction Engineering I</b>						<b>33</b>
AT00DF82	Professional Physics – Building		3			3
AT00CZ94	Basics of Steel Structures		5			5
AT00DB66	Digitalization and Measurements I		5			5
AT00DF83	Statics II		4			4
AT00DF32	Derivation and Integration		3			3
AT00CZ86	Construction Management		3			3

AT00DD78	Statistical Mathematics		3		3
AT00CZ88	Basics of Construction Engineering		3		3
AT00CZ89	Developing Professional Competences III		1		1
KR00BU42	Swedish for Work, Spoken		1		1
KR00DD61	Swedish for Work, Written		2		2
<b>TLTISCT25S-1005 Construction Engineering II</b>					<b>30</b>
AT00CZ84	Basics of Timber Structures		5		5
AT00CZ91	Basics of Concrete Structures		5		5
AT00DB67	Digitalization and Measurements II		5		5
AT00CZ81	Building Physics		5		5
AT00DF84	Projectwork III		3		3
AT00CZ96	Geotechnics I		5		5
KE00DD58	Intercultural Competence		2		2
<b>TLTISCT25S-1006 Specialization</b>					<b>60</b>
<b>TLTISCT25S-1007 Specialization I</b>					<b>30</b>
<b>TLTISCT25S-1008 Specialization II</b>					<b>30</b>
<b>TLTISCT25S-1009 Practical Training</b>					<b>30</b>
HA00CZ97	Practical Training I	10			10
HA00CZ98	Practical Training II		10		10
HA00DA07	Practical Training III			10	10
<b>TLTISCT25S-1010 Thesis</b>					<b>15</b>
AO00CE85	Thesis Planning			5	5
AO00CE86	Thesis Research and Writing			5	5
AO00CE87	Thesis Publication			5	5
<b>TLTISCT25S-1011 COMPLEMENTARY COMPETENCE</b>					<b>15</b>
<b>TLTISCT25S-1012 Advanced Engineering</b>					<b>15</b>
AT00DA00	Computer Analysis and FEM			5	5
AT00DA01	Cost Estimation, Quantity Surveys, Life-Cycle & Carbon Footprint calculations			5	5
AT00DA02	Advanced mathematics and RDI-solutions			5	5

## TLTISCT25S-1001 CORE COMPETENCE: 225 ECTS

## TLTISCT25S-1002 Basics of Engineering I: 33 ECTS

### AT00DD74 Basics of Algebra: 3 ECTS

#### Learning outcomes

The student is able to

- simplify and handle mathematical expressions
- solve basic equations and system of two linear equations

- basics of percentage calculation

### **AT00CZ68 Digital Skills: 3 ECTS**

#### **Learning outcomes**

The student:

- knows the basic tools of Microsoft Excel and is able to use excel as a calculation tool, use it to process and sort data
- knows the basics of Mathcad and is able to make simple calculation sheets
- knows the basic tools of Microsoft Word and is able to make different types of documents and modify reports

### **A300CE13 Orientation to Sustainability Thinking: 2 ECTS**

#### **Learning outcomes**

Identify and define central concepts and frameworks related to sustainability. Recognize the interconnectedness of economic, social and environmental sustainability issues. Understand and develop own individual role in driving sustainability.

#### **Evaluation criterias**

Level 1

Pass-Fail

### **AT00DF80 Orientation to Construction Engineering: 3 ECTS**

#### **Learning outcomes**

The student:

- understands what is the building trade and what kind of tasks and skills is required.
- knows the future trends in the field of construction and has a understanding what goals and aspects are important to the process.
- understands the differences of projects and processes.

### **AT00CZ70 Basics of Building Engineering & AutoCAD: 5 ECTS**

#### **Learning outcomes**

The student:

- understands the whole of the parts of a building and their main functions
- knows different options and general requirements for the outer shell (envelope), surfaces and non-load bearing structures as well as the complementary building components
- understands the concepts of fire safety in buildings and the principles of moisture insulation
- is familiar with the general drawing markings
- knows the basics of computer-aided designing.

### **AT00CZ71 Developing Professional Competences I: 1 ECTS**

#### **Learning outcomes**

The student is able to:

- plan their own learning and cooperate in situations related to their own field of studies
- recognize their own competence and the needs to develop them further and to plan their careerpath observing them
- act as a group member
- operate in the learning environments of LAB University of Applied Sciences
- picture their own field of studies and its future skills- give feedback on tuition and services and thus participate in the development of education

### **AT00DD75 Geometry and Vectors: 3 ECTS**

#### **Learning outcomes**

The student is able to

- solve the angles and sides of different types of triangles and use similarity
- solve geometric problems
- knows basics of vectors in plane and space

### **KE00CE75 English for Professional Communication: 5 ECTS**

#### **Learning outcomes**

Proficiency level: B2

The student is able to

- identify the characteristics of academic texts and to apply academic conventions to their writing
- demonstrate critical thinking and find, evaluate and use information effectively
- communicate clearly and effectively in different generic and field-specific workplace situations both orally and in writing
- function collaboratively in contemporary working environments in English.

### **K200CE69 Finnish 1: 3 ECTS**

#### **Learning outcomes**

The student is able to

- identify and use the course vocabulary and phrases for common everyday situations
- tell about oneself and understand basic questions
- read and write simple sentences related to the course topics.

Proficiency level: A1

### **K200CE70 Finnish 2: 3 ECTS**

#### **Learning outcomes**

The student is able to

- communicate in most common everyday situations
- understand slowly and clearly spoken Finnish when the topic and the vocabulary are familiar
- understand and write a simple message or text
- use the basic vocabulary and some grammatical structures of Finnish.

Proficiency level: A1

**Prerequisites**

Finnish 1 or similar skills

**KE00DD58 Intercultural Competence: 2 ECTS****Learning outcomes**

The student is able to

- understand cultural similarities and differences using theoretical frameworks
- has skills and competences to develop their intercultural sensitivity
- understand culture adaptation and adjustment.

**KS00DD59 Expert Communication Skills: 5 ECTS****Learning outcomes**

The student is able to

- identify and assess their communication skills and give, receive and use feedback to develop their communication skills
- act purposefully, appropriately and skilfully in communication and interaction situations in work life and in his/her professional field (text, presentation and group communication skills)
- take into account the requirements of the recipient/interaction partner, the situation and the field in which they are communicating
- communicate in a structured, understandable and convincing way
- develop their Finnish language and communication skills as part of their expertise and professional competence (willingness and motivation to continuously learn and develop communication skills).

**TLTISCT25S-1003 Basics of Engineering II: 29 ECTS****AT00CZ73 Basics of BIM: 5 ECTS****Learning outcomes**

The student:

- understands the basic concepts of building information modelling and the principles of the information model-based construction process.
- can handle the basic use of information model-based design programs and model review programs.
- understands openBIM based workflow and principles of essential standards of openBIM

**AT00CZ74 Statics I: 3 ECTS****Learning outcomes**

The student:

- understands the basic concepts of statics
- masters the equilibrium considerations of structures
- is able to solve stress distributions of simple statically determined bar structures.

**AT00DE97 Basic Physics: 3 ECTS**

**Learning outcomes**

The student is able to

- understand the purpose of the physics in technology
- describe and utilize the SI-unit system and implement
- solve mathematical problems in kinematics, mechanics and thermodynamics
- utilize vectors

**AT00DD76 Functions and Equations: 3 ECTS****Learning outcomes**

The student is able to

- identify different types of functions and their graphs
- methods for solving inequalities and special equations
- system of equations and matrices

**AT00DF81 Strength of Materials: 4 ECTS****Learning outcomes**

The student is able to

- apply the theory of strength based on elasticity as a basis for the design of load-bearing structures and understand the basics of plasticity theory and stability phenomena and the solution principles of statically indeterminate structures.

**AT00CZ78 Concrete Technology: 3 ECTS****Learning outcomes**

The student:

- understands the effect of different factors on the properties of concrete mass and hardened concrete
- can test the quality properties of concrete and evaluate the workability of concrete mass
- is able to apply the knowledge of concrete technology to the planning and management of concrete work

**AT00CZ79 Building Materials: 5 ECTS****Learning outcomes**

The student:

- identifies the basic materials, basic characteristics and uses of materials in construction.
- understands the effects of the properties and uses of building materials in construction and is able to utilise the knowledge in new situations.
- understands the basics and different aspects of chemistry in relation to building materials.
- understands recycling, re-use and waste-sorting of building materials and in the field of construction industry.

**AT00CZ80 Developing Professional Competences II: 1 ECTS**

**Learning outcomes**

The student is able to:

- utilize various learning opportunities in curriculum
- recognize and aim their own competences to be in level with the future career requirements
- create a study plan that supports the future career goal
- give feedback on tuition and services and thus participate in the development of education

**K200DD57 Finnish for Technology: 2 ECTS****Learning outcomes**

The student is able to

- use previously learned structures and words
- use some presentation phrases
- describe some processes in their field in simple terms

Proficiency level: A1

**TLTISCT25S-1004 Construction Engineering I: 33 ECTS****AT00DF82 Professional Physics – Building: 3 ECTS****Learning outcomes**

After completing the course, the student knows the basics of hydrostatics, hydrodynamics, wave and sound theory, thermodynamic circulation processes (heat power machines and refrigeration equipment (heat pump) and energy production

**AT00CZ94 Basics of Steel Structures: 5 ECTS****Learning outcomes**

- The student knows how to design and dimension basic load-bearing steel structures (beams, columns etc.) according to EC 3 in the ultimate and serviceability limit states.
- The student can apply knowledge related to the operation of structural units to steel structures. Knows different connections and understands the principals of joints
- Understand the phenomena occurring in structures and components.
- Understands the manufacturing techniques and erection phase in different types of Steel Frames

**AT00DB66 Digitalization and Measurements I: 5 ECTS****Learning outcomes**

The student:

- knows basic methods and technologies of built environment digitalization and related measurements
- understands basics and knows how to use relevant measurement tools of built environment
- has understanding of more advanced methods, tools, models and visualizations of digitalization of built environment

## **AT00DF83 Statics II: 4 ECTS**

### **Learning outcomes**

The student is able to:

- calculate normal force, shear force, bending moment and torsion moment distributions of static determined and undetermined structures: beams, columns, frames, trusses, archs.
- use basic calculation software tools in structural analysis

## **AT00DF32 Derivation and Integration: 3 ECTS**

### **Learning outcomes**

The student is able to

- basics of derivation and applied in optimization
- basics of integrals and apply integration to calculate areas and volumes

## **AT00CZ86 Construction Management: 3 ECTS**

### **Learning outcomes**

Students are able to:

- understand the basic principles of supervision and knows what requirements are set for the cooperation between a supervisor and a subordinate.
- understand the basics of occupational safety issues.
- gain the ability to develop their own leadership skills.
- know the tasks of construction, documents related to construction and tendering, design and implementation contracts and construction project principles
- recognize different types of contracts used in the construction industry and related procedures and is able to assess their suitability.

## **AT00DD78 Statistical Mathematics: 3 ECTS**

### **Learning outcomes**

The student is able to

- basics of probability calculation and statistical mathematics
- use the software as a data analysis tool

## **AT00CZ88 Basics of Construction Engineering: 3 ECTS**

### **Learning outcomes**

The student knows the design principles of load-bearing structures, is able to determine the loads on buildings and structures, is able to evaluate alternative load-bearing structural systems suitable for a building and calculate the loads on structural components. The student knows the principles of norm control in structural design. The student knows the basics of limit state analysis. Able to determine loads in different limit states and to bring the loads down to the ground.

## **AT00CZ89 Developing Professional Competences III: 1 ECTS**

### **Learning outcomes**



The student is able to

- identify themselves as a learner and develop their own learning skills
- evaluate innovative or alternative future competences required in their own field
- recognize and aim their own competences to be in level with the future career requirements
- masters the professional concepts of their own field and is able to point out their competencies during job recruitment processes
- give feedback on tuition and services and thus participate in the development of education

### **KR00BU42 Swedish for Work, Spoken: 1 ECTS**

#### **Learning outcomes**

The student is able to

- convey and validate arguments
- use vital field-specific vocabulary
- communicate essential matters about their education, work experience and tasks
- present their field-specific operational environment
- communicate in various working life situations in Swedish.

The student completes the Public Administration Language Test in Swedish.

### **KR00DD61 Swedish for Work, Written: 2 ECTS**

#### **Learning outcomes**

The student is able to

- use vital field-specific vocabulary
- communicate essential matters about their education, work experience and tasks
- understand and produce various short texts related to studies and working life
- acquire information on their field in Swedish
- use online dictionaries.

The student completes the Public Administration Language Test in Swedish.

### **TLTISCT25S-1005 Construction Engineering II: 30 ECTS**

### **AT00CZ84 Basics of Timber Structures: 5 ECTS**

#### **Learning outcomes**

The student is able to:

- The student knows how to design and dimension basic load-bearing wooden structures (beams, columns etc.) according to EC 5 in the ultimate and serviceability limit states.
- The student can apply knowledge related to the operation of structural units to wooden structures. Knows different connections and understands the principals of joints
- understand the phenomena occurring in structures and components.
- understands the manufacturing techniques and erection phase in different types of Timber Buildings

### **AT00CZ91 Basics of Concrete Structures: 5 ECTS**

**Learning outcomes**

The student:

- knows how to design and dimension basic load-bearing concrete structures (beams, columns etc.) according to EC 2 in the ultimate and serviceability limit states.
- can apply knowledge related to the operation of structural units to concrete structures.
- understand the phenomena occurring in structures and components.
- understands the manufacturing techniques and erection phase in different types of Concrete Buildings

**AT00DB67 Digitalization and Measurements II: 5 ECTS****Learning outcomes**

The student:

- can apply knowledge related to the digital built environment technologies
- knows how to design and develop practical use cases by combining different modern new technologies, models, visualizations and digital tools of built environment
- understands concepts and possibilities of digital twins

**AT00CZ81 Building Physics: 5 ECTS****Learning outcomes**

The student knows how to:

- calculate heat transfer and the factors affecting the energy efficiency of the building and structures
- calculate moisture loads of the building and structures and examine the moisture transfer in structures, knows the process of moisture management
- understands the thermal and moisture technical operation and planning of basic structures and the basics of sound technology
- knows the basics of indoor air quality management and building physical measurements

**AT00DF84 Projectwork III: 3 ECTS****Learning outcomes**

Project work can be carried out as applicable work assignments.

**AT00CZ96 Geotechnics I: 5 ECTS****Learning outcomes**

The student:

Basic of geology, soil classification, groundwater, ground investigations.

Basics of foundation methods, including shallow foundations and piling, soil improvement, excavations, frost protection and drainage.

The student knows the machines and methods used in construction work as well as the requirements for construction structures.

The student is able to plan machine combinations for different work sites.

**KE00DD58 Intercultural Competence: 2 ECTS**

**Learning outcomes**

The student is able to

- understand cultural similarities and differences using theoretical frameworks
- has skills and competences to develop their intercultural sensitivity
- understand culture adaptation and adjustment.

**TLTISCT25S-1006 Specialization: 60 ECTS****TLTISCT25S-1007 Specialization I: 30 ECTS****TLTISCT25S-1008 Specialization II: 30 ECTS****TLTISCT25S-1009 Practical Training: 30 ECTS****HA00CZ97 Practical Training I: 10 ECTS****Learning outcomes**

The student is able to

- describe work-related phenomena and use related concepts
- act in a productive way, following the practices of the workplace and the ethical principles of the profession
- use the techniques, work methods, models and processes that they have learnt
- act in a customer-oriented way in interactive situations in the workplace and in the cooperation network
- evaluate and develop their own competence in the work done in practical training

**HA00CZ98 Practical Training II: 10 ECTS****Learning outcomes**

The student is able to

- describe work-related phenomena and use related concepts
- act in a productive way, following the practices of the workplace and the ethical principles of the profession
- use the techniques, work methods, models and processes that they have learnt
- act in a customer-oriented way in interactive situations in the workplace and in the cooperation network
- evaluate and develop their own competence in the work done in practical training

**HA00DA07 Practical Training III: 10 ECTS****Learning outcomes**

The student is able to

- describe work-related phenomena and use related concepts
- act in a productive way, following the practices of the workplace and the ethical principles of the profession
- use the techniques, work methods, models and processes that they have learnt

- act in a customer-oriented way in interactive situations in the workplace and in the cooperation network
- evaluate and develop their own competence into the work done in practical training

### **TLTISCT25S-1010 Thesis: 15 ECTS**

### **AO00CE85 Thesis Planning: 5 ECTS**

#### **Learning outcomes**

The student is able to:

- describe the objectives and core contents of their thesis
- plan and describe the stages of the thesis process
- take into account the possible research permit and copyright issues.

### **AO00CE86 Thesis Research and Writing: 5 ECTS**

#### **Learning outcomes**

The student is able to:

- implement the thesis on the basis of an approved thesis plan.

### **AO00CE87 Thesis Publication: 5 ECTS**

#### **Learning outcomes**

The student is able to:

- present the results or output of their thesis
- report on their thesis in writing in accordance with the thesis guidelines of LAB University of Applied Sciences
- write a maturity test.

### **TLTISCT25S-1011 COMPLEMENTARY COMPETENCE: 15 ECTS**

### **TLTISCT25S-1012 Advanced Engineering: 15 ECTS**

### **AT00DA00 Computer Analysis and FEM: 5 ECTS**

#### **Learning outcomes**

The student is able to:

- understand the FEM Calculation principles (Stiffness Matrix & Matrix calculation)
- make FEM-calculations in basic frames, panels & joints and use BIM integrated with FEM
- understand the basics of dynamic analysis in FEM

### **AT00DA01 Cost Estimation, Quantity Surveys, Life-Cycle & Carbon Footprint calculations: 5 ECTS**

#### **Learning outcomes**

The student understands what is:

- Quantity surveys
- Cost Estimation
- Life cycle & Carbon footprint calculations

## **AT00DA02 Advanced mathematics and RDI-solutions: 5 ECTS**

### **Learning outcomes**

The student

- is able to apply derivation in engineering
- masters the basics of integration as well as is able to apply integration in engineering sciences
- can solve 1st and 2nd order differential equations