02.04.2024

Curriculum at LAB University of Applied Sciences 2024-2025

Bachelor of Engineering, Sustainable Construction Technology 24S, full-time studies, Lahti

Code	Name	1 y	2 y	3 y	4 y	ECTS total
TLTISCT24S-1001	**CORE COMPETENCE**					**225**
TLTISCT24S-1019	**Basics of Engineering I**					**30**
AT00CH47	Basic studies in mathematics	3				3
AT00CZ68	Digital Skills	3				3
KE00CE75	English for Professional Communication	5				5
A300CE13	Orientation to Sustainability Thinking	2				2
AT00CZ69	Orientation to Construction Engineering	2				2
AT00CZ70	Basics of Building Engineering & AutoCAD	5				5
AT00CZ71	Developing Professional Competences I	1				1
KE00CE74	Intercultural Awareness	3				3
AT00CZ72	Projectwork I	1				1
K200CE69	Finnish 1	3				3
KR00BU42	Swedish for Work, Spoken	1				1
KR00BU43	Swedish for Work, Written	1				1
TLTISCT24S-1020	**Basics of Engineering II**					**30**
AT00CZ73	Basics of BIM	5				5
AT00CZ74	Statics I	3				3
AT00CZ75	Physics	4				4
K200CE70	Finnish 2	3				3
KS00BT59	Expert Communication Skills	4				4
AT00CH48	Mathematics in Technology 1	3				3
AT00CZ77	Projectwork II	3				3
AT00CZ78	Concrete Technology	3				3
AT00CZ79	Building Materials	5				5
AT00CZ80	Developing Professional Competences II	1				1
TLTISCT24S-1021	**Construction Engineering I**					**30**
AT00CZ81	Building Physics		5			5
AT00DB66	Digitalization and Measurements I		5			5
AT00CZ90	Statics II		5			5
AT00CZ85	Strength of materials		5			5

AT00CZ86	Construction Management		3			3
AT00CH49	Mathematics in Technology 2		3			3
AT00CZ88	Basics of Construction Engineering		3			3
AT00CZ89	Developing Professional Competences III		1			1
TLTISCT24S-1022	**Construction Engineering II**					**30**
AT00CZ84	Basics of Timber Structures		5			5
AT00CZ91	Basics of Concrete Structures		5			5
AT00DB67	Digitalization and Measurements II		5			5
AT00CZ94	Basics of Steel Structures		5			5
AT00CZ95	Projectwork III		5			5
AT00CZ96	Geotechnics I		5			5
TLTISCT24S-1023	**Specialization**					**60**
TLTISCT24S-1024	**Specialization I**					**30**
TLTISCT24S-1025	**Specialization II**					**30**
TLTISCT24S-1026	**Practical Training**					**30**
HA00CZ97	Practical Training I	10				10
HA00CZ98	Practical Training II		10			10
HA00DA07	Practical Training III			10		10
TLTISCT24S-1011	**Thesis**					**15**
AO00CE85	Thesis Planning			5		5
AO00CE86	Thesis Research and Writing				5	5
AO00CE87	Thesis Publication				5	5
TLTISCT24S-1012	**COMPLEMENTARY COMPETENCE**					**15**
TLTISCT24S-1027	**Advanced Engineering**					**15**
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

TLTISCT24S-1001 CORE COMPETENCE: 225 ECTS

TLTISCT24S-1019 Basics of Engineering I: 30 ECTS

AT00CH47 Basic studies in mathematics: 3 ECTS

Learning outcomes
Student is able to
- calculate and simulate mathematical expressions
- solve geometric and trigonometric problems
- knows bacis of vectors in plane

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

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.

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

AT00CZ69 Orientation to Construction Engineering: 2 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

KE00CE74 Intercultural Awareness: 3 ECTS

Learning outcomes
Students are able to
-understand cultural similarities and differences
-work effectively with international partners
-analyze business and work life cultures including Finland using different cultural frameworks
-understand culture adaptation and adjustment.

AT00CZ72 Projectwork I: 3 ECTS

Learning outcomes
The student:
- understands the basics of project management and different roles connected to projects
- knows how to work as part of a team and can operate in a team and work towards a shared goal and combine skills learned
Project work can be carried out as applicable work assignments.

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

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.

KR00BU43 Swedish for Work, Written: 1 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.

TLTISCT24S-1020 Basics of Engineering II: 30 ECTS

AT00CZ73 Basics of BIM: 5 ECTS

Learning outcomes
The student:
- undertands 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.
- undertands 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.

AT00CZ75 Physics: 4 ECTS

Learning outcomes
The student:
- understand the importance of physics in technology
- can describe the SI unit system and make unit conversions
- can solve problems of kinematics, mechanics and thermodynamics mathematically
- can apply vector calculus in mechanics phenomena
- Basics of Hydrostatics & Hydrodynamics
- Basics of wave theory & Sound theory

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

KS00BT59 Expert Communication Skills: 4 ECTS

Learning outcomes
Proficiency level: C2

The student masters Finnish language as a mother tongue in all professional spoken and written communication situations.

AT00CH48 Mathematics in Technology 1: 3 ECTS

Learning outcomes
Student is able to:
- recognise different polynomial equations, functions, and polynomial graphics
- solve inequalities
- solve simultaneous equations with the software
- solve basic space vectors
- utilise space vectors
- solve exponential and logarithm functions

AT00CZ77 Projectwork II: 3 ECTS

Learning outcomes
Project work can be carried out as applicable work assignments.

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

TLTISCT24S-1021 Construction Engineering I: 30 ECTS

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

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

AT00CZ90 Statics II: 5 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

AT00CZ85 Strength of materials: 5 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.

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.

AT00CH49 Mathematics in Technology 2: 3 ECTS

Learning outcomes
Student is able to:
- derivate functions and utilise derivation in practice
- integrate polynomial functions and utilise integration in practice
- solve other equations and trigonometrical problems

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

TLTISCT24S-1022 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 develope practical use cases by combining different modern new technologies, models, visualizations and digital tools of built environment
- understands consepts and possibilities of digital twins

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

AT00CZ95 Projectwork III: 5 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, groudwater, 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.

TLTISCT24S-1023 Specialization: 60 ECTS

TLTISCT24S-1024 Specialization I: 30 ECTS

TLTISCT24S-1025 Specialization II: 30 ECTS

TLTISCT24S-1026 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 int 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 int 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 int the work done in practical training

TLTISCT24S-1011 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.

TLTISCT24S-1012 COMPLEMENTARY COMPETENCE: 15 ECTS

TLTISCT24S-1027 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 integated 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