06.11.2024

Curriculum at LAB University of Applied Sciences
2025-2026

Bachelor’s of Engineering, Environment and Circular Economy Solutions Engineering (in Finnish) 25K, online studies

Code	Name	1 y	2 y	3 y	4 y	ECTS total
TLTIKTEC25KV-1001	**CORE COMPETENCE**					**150**
TLTIKTEC25KV-1047	**Common studies**					**15**
AY00BU56	Developing professional competence 1	1				1
AY00BU57	Developing professional competence 2		1			1
AY00BU58	Developing professional competence 3			1		1
A300CE13	Orientation to Sustainability Thinking	2				2
KE00BT61	English for Work	4				4
KR00BU42	Swedish for Work, Spoken		1			1
KR00BU43	Swedish for Work, Written		1			1
KS00BT59	Expert Communication Skills	4				4
TLTIKTEC25KV-1003	**Professional Core Competence**					**90**
TLTIKTEC25KV-1045	**Mathematics**					**15**
AT00DE22	Basics of Engineering Mathematics	5				5
AT00DE23	Advanced Engineering Mathematics	5				5
AT00DE24	Economic and Statistical Mathematics		5			5
TLTIKTEC25KV-1046	**Chemistry and Physics of Enviromental Engineering**					**15**
AT00BT70	Basic studies in physics	3				3
AT00DE26	Physics of enviromental engineering		3			3
AT00DD02	Basic Chemistry	4				4
AT00DE32	Environmental Chemistry and Monitoring	5				5
TLTIKTEC25KV-1004	**Basics of environmental engineering**					**15**
AT00CP39	Ecosystems and Climate Change	5				5
AT00DC89	Water and energy management	5				5
AT00DE02	Research Methods and Reporting		5			5
TLTIKTEC25KV-1006	**Material Cycles**					**15**
AT00CP41	Contaminated Soil and waste Management	5				5
AT00CP45	Technical and biological material cycles	5				5
AT00CP46	Material efficiency in business	5				5
TLTIKTEC25KV-1007	**Circular Economy Guiding Methods**					**15**

AT00CP49	Circular economy business models and product design		5			5
AT00DB60	Environmental Legislation and Administration	5				5
AT00CP44	Environmental Impact Management		5			5
TLTIKTEC25KV-1008	**Digital tools for Circular Economy**					**15**
AT00CP51	Computer Aided design and modelling	5				5
AT00CP52	GIS and digital applications		5			5
AT00CP53	Life Cycle Analyses		5			5
TLTIKTEC25KV-1009	**Practical Training**					**30**
HA00CD55	Practical Training				10	10
HA00BU60	Practical Training 2				10	10
HA00BU61	Practical Training 3				10	10
TLTIKTEC25KV-1010	**Thesis**					**15**
AO00BU62	Thesis Planning				5	5
AO00BU63	Thesis Project				5	5
AO00BU64	Thesis Report				5	5
TLTIKTEC25KV-1011	**COMPLEMENTARY COMPETENCE**					**90**
TLTIKTEC25KV-1012	**Circular Economy Applied Studies and Projects**					**15**
AT00CZ00	Applied environmental projects 1					0
AT00CZ01	Applied environmental projects 2					0
AT00CZ02	Applied environmental projects 3					0
TLTIKTEC25KV-1013	**Sustainable Solutions Engineering**					**0**
TLTIKTEC25KV-1014	**Sustainable Energy Management**					**15**
TLTIKTEC25KV-1015	**Environmental, Quality and Project Management**					**15**
TLTIKTEC25KV-1016	**Circular Economy Co-Creation Hubs**					**15**
TLTIKTEC25KV-1017	**Digital Tools for Circular Economy**					**15**
TLTIKTEC25KV-1018	**Sustainable Industrial Management**					**15**
TLTIKTEC25KV-1019	**Sustainable Sludge and Water Management**					**15**
TLTIKTEC25KV-1020	**Wood Technology**					**0**
TLTIKTEC25KV-1048	**Basic studies in Wood Engineering**					**15**
AT00BZ06	Wood Construction	5				5
AT00BZ04	Glueing	5				5
AT00BZ05	Surface Treatment	5				5
TLTIKTEC25KV-1022	**Basics of Wood and Biotechnology**					**15**
TLTIKTEC25KV-1049	**Sawmill Industry**					**15**
AT00BZ02	Forest and Raw Materials	5				5
AT00DD38	Sawmill Industry and Further Processing		5			5
AT00DC80	Drying and Thermal Modification		5			5
TLTIKTEC25KV-1050	**Panel Products and Engineered Wood Products**					**15**
AT00DC81	Plywood and LVL Industries			5		5

AT00DC82	Joinery Industry		5			5
AT00DC83	Other Engineered Wood Products			5		5
TLTIKTEC25KV-1051	**Furniture Industry**					**15**
AT00DC85	Woodworking and Work Safety	5				5
AT00BZ15	Furniture Industry		5			5
AT00BZ16	Industrial Processes and Production		5			5
TLTIKTEC25KV-1026	**Biomaterials and Food Technology**					**0**
TLTIKTEC25KV-1033	**Urban Planning**					**0**
TLTIKTEC25KV-1034	**Development of Residential Environments**					**15**
TLTIKTEC25KV-1035	**Municipality as an Operating Environment**					**15**
AT00BY93	Municipality as an Operating Environment					0
AT00BY94	Development project of municipality					0
TLTIKTEC25KV-1036	**Elective Studies**					**0**
TLTIKTEC25KV-1037	**Business and Production Economy**					**15**
AT00DA77	Business Operations in the Technology Industry					0
TLTIKTEC25KV-1038	**From data to machine learning**					**15**
AT00BY42	Data analysis and visualization					0
AT00BY43	Machine Learning					0
TLTIKTEC25KV-1039	**Basics of construction**					**30**
AT00CB13	Construction materials					0
AT00CB14	Concrete technics I					0
AT00CB15	Basics of Building Engineering					0
AT00CB16	Basics of Civil Engineering					0
AT00CB17	Basics of Surveying Technique					0
AT00CB18	Geotechnics					0
AT00CB19	Earthwork Engineering and Rock Excavation					0
TLTIKTEC25KV-1040	**Civil engineering II**					**15**
AT00CD36	Hydrology and Hydraulic Engineering					0
AT00CZ28	Rock construction technique					0
AT00CD38	Network Engineering					0
AT00CZ19	Network design					0
TLTIKTEC25KV-1041	**Civil engineering III**					**15**
AT00CD40	Intersections and Transportation Systems					0
AT00CD41	Environmental Geotechnology					0
AT00CD42	Maintenance of Infrastructure					0
AT00CD43	Surveying Technology and Automative Machinery					0
KTE2190	Basics of Bridges Engineering					0

TLTIKTEC25KV-1001 CORE COMPETENCE: 150 ECTS

TLTIKTEC25KV-1047 Common studies: 15 ECTS

AY00BU56 Developing professional competence 1: 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

AY00BU57 Developing professional competence 2: 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

AY00BU58 Developing professional competence 3: 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 competenciesduring job recruitment processes
- give feedback on tuition and services and thus participate in the development of education

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

KE00BT61 English for Work: 4 ECTS

Learning outcomes
Proficiency level: B2

The student is able to
- communicate clearly and effectively in different generic and field-specific workplace situations both orally and in writing
- find, evaluate and use information effectively
- function collaboratively in international working environments.

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.

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.

TLTIKTEC25KV-1003 Professional Core Competence: 90 ECTS

TLTIKTEC25KV-1045 Mathematics: 15 ECTS

AT00DE22 Basics of Engineering Mathematics: 5 ECTS

Learning outcomes
Student is able to
-simplify and handle mathematical expressions
- solve basic equations and system of two linear equations
- solve geometric and trigonometric problems
- knows bacis of vectors in plane

AT00DE23 Advanced Engineering Mathematics: 5 ECTS

Learning outcomes
Student is able to
- recognise different functions
- solve exponential and logarithm equations
- solve inequalities
- solve simultaneous equations with the software
- basics of differential calculations

AT00DE24 Economic and Statistical Mathematics: 5 ECTS

Learning outcomes
Student is able to
- percentage and interest calculation
- fundamentals of profit and investment calculation
- basics of probability calculation and statistical mathematics
- use the software as a data analysis tool

TLTIKTEC25KV-1046 Chemistry and Physics of Enviromental Engineering: 15 ECTS

AT00BT70 Basic studies in physics: 3 ECTS

Learning outcomes
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

AT00DE26 Physics of enviromental engineering: 3 ECTS

Learning outcomes
Student is able to
- solve mathematical problems in electrical sciences and the decibel scale
- conduct physical measurements and draft a proper report on their findings
- apply digitalisation in the processing of results

AT00DD02 Basic Chemistry: 4 ECTS

Learning outcomes
The student is able to:
- to understand the meaning of the chemistry as an essential part of engineering
- to know the atomic structure and chemical bonds
- to describe and identify common inorganic compounds as well as the groups and structures of organic compounds.
- to use the basic chemical equations and reactions
- use the electrochemical series of metals
- to compute acid and base calculations s and explain the basics related to acid-base titration

AT00DE32 Environmental Chemistry and Monitoring: 5 ECTS

Learning outcomes
The student is able to:
- calculate heats of reaction and understand the basics of thermochemistry
- understand the basics of combustion and use combustion reactions to make flue gas calculations
- identify harmful substances in the environment, their key properties and behavior in different environmental matrices
- use samplers and field meters commonly used in water sampling
- know the basic principles of fieldwork and laboratory work and their reliability assessment as part of quality assurance

TLTIKTEC25KV-1004 Basics of environmental engineering: 15 ECTS

AT00CP39 Ecosystems and Climate Change: 5 ECTS

Learning outcomes
The student is able to:
- explain the main principles of ecosystems and nutrient cycles
- identify human impacts on ecosystems, especially the reasons for and results of climate change
- identify ecosystem services and to reflect on their effects in society
carry out teamwork, applying reporting and information acquisition skills

AT00DC89 Water and energy management: 5 ECTS

Learning outcomes
The student
- knows the basic principles of sustainable water and energy supply options and the most common technologies involves
- understands the importance of sustainable, safe and economical water and energy supply as part of public service activities
- can identify the effects of climate change on water and energy supply, as well as the effects of energy supply on climate change
- learns teamwork skills, as well as how to search for information about the subject area and to communicate about it

AT00DE02 Research Methods and Reporting: 5 ECTS

Learning outcomes
The student is able to:
- know basic principles of the most common research methods and ethical principles in the field
- find and apply information
- apply different statistical data processing methods
- implement a working life-oriented project in a group
- write a report according to the instructions and present the results of their work
- apply principles of the environmental technology thesis process

TLTIKTEC25KV-1006 Material Cycles: 15 ECTS

AT00CP41 Contaminated Soil and waste Management: 5 ECTS

Learning outcomes
The student knows:
- the main methods of management and regulation in the field
- how to emphasise the impact of circular economy as part of sustainable waste management solutions
- how to identify key emission sources that cause soil and groundwater contamination
- the main principles of assessing the need for soil rehabilitation and the main rehabilitation methods

AT00CP45 Technical and biological material cycles: 5 ECTS

Learning outcomes
The Student:
- understands the importance of the sustainable consumption and use of technical and biological materials
- learns ways in which the consumption of particularly natural, non-renewable materials can be reduced
- gets basic information about planning and business models according to circular economy principles, which take into account the importance of material choices during the entire life cycle of products, processes and services
- identifies the value chains of selected industries, in terms of the material cycles involved

AT00CP46 Material efficiency in business: 5 ECTS

Learning outcomes
The student is able to:
- explain the common industrial material recycling processes and the technical solutions involved
- determine the key actors and current development areas in recycling
- understand basic solutions and practices for developing material efficiency
- carry out a material audit
- prepare an enterprise's material flow analysis
- explain the importance and practices of industrial symbiosis and material recycling as part of circular economy

- promote industrial symbioses between companies

TLTIKTEC25KV-1007 Circular Economy Guiding Methods: 15 ECTS

AT00CP49 Circular economy business models and product design: 5 ECTS

Learning outcomes
The student is able to:
- explain circular economy business models
- describe the main principles of cost accounting
- understand the product development process according to circular economy and the impact of value chains on it

AT00DB60 Environmental Legislation and Administration: 5 ECTS

Learning outcomes
The student is able to:
- find up-to-date information related to environmental legislation from free and paid information services
- outline the responsibilities of environmental legislation and various environmental management level tasks
- apply key laws and regulations of the environmental legislation through practical examples

AT00CP44 Environmental Impact Management: 5 ECTS

Learning outcomes
The student is able to:
- identify the main environmental impacts of different industries
- explain the basic techniques for minimising the harmful environmental impacts of enterprises
- explain the regulations and objectives related to environmental impact assessment
- analyse environmental data using statistical methods
- describe how project-level environmental impact assessment progresses and understand the assessment methods in general use
- describe the participatory procedures related to processes and the factors influencing their success
- study existing environmental impact assessment cases and report on them

TLTIKTEC25KV-1008 Digital tools for Circular Economy: 15 ECTS

AT00CP51 Computer Aided design and modelling: 5 ECTS

Learning outcomes
The student is able to:
- identify the potential of computer-aided design
- understand the basics of cad drawing and prepare simple drawings with the aid of the programme's basic functions
- explain the main principles of 3D- and data modelling of the built environment
- identify possible application of different modelling methods in the environmental field

AT00CP52 GIS and digital applications: 5 ECTS

Learning outcomes
The student is able to:
- identify the impacts and opportunities of digitalisation and industry 4.0 in the environmental sector
- understand the main principles of machine learning and programming
- explain applications of spatial data and use the QGIS spatial data programme (or a similar one)
- utilise various environmental databases
- recognise the risks of digitalisation and understand the significance of cyber security

AT00CP53 Life Cycle Analyses: 5 ECTS

Learning outcomes
The student is able to:
- describe the stages of the life cycle of products, as well as the environmental factors related to them
- understand commonly used life cycle methods and their uses
- carry out a life cycle analysis for the selected product

TLTIKTEC25KV-1009 Practical Training: 30 ECTS

HA00CD55 Practical Training: 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

HA00BU60 Practical Training 2: 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

HA00BU61 Practical Training 3: 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

TLTIKTEC25KV-1010 Thesis: 15 ECTS

AO00BU62 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

AO00BU63 Thesis Project: 5 ECTS

Learning outcomes
The student is able to:
- implement the thesis on the basis of an approved thesis plan.

AO00BU64 Thesis Report: 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.

TLTIKTEC25KV-1011 COMPLEMENTARY COMPETENCE: 90 ECTS

TLTIKTEC25KV-1012 Circular Economy Applied Studies and Projects: 15 ECTS

AT00CZ00 Applied environmental projects 1: 5 ECTS

Learning outcomes
The student is able to:
- use the concepts related to the project in a coherent and justify their actions on the basis of the

knowledge base
- find starting points, needs and criteria for project activities
- to act purposefully, to assess the activity and make suggestions for improvement
- applied to the project a variety of different techniques, methods and ways of working
- operate safely, ethically and customer-oriented
- to act responsibly and in a target group and as otherwise required by the project in interactive situations

AT00CZ01 Applied environmental projects 2: 5 ECTS

Learning outcomes
The student is able to:
- use the concepts related to the project in a coherent and justify their actions on the basis of the knowledge base
- find starting points, needs and criteria for project activities
- to act purposefully, to assess the activity and make suggestions for improvement
- applied to the project a variety of different techniques, methods and ways of working
- operate safely, ethically and customer-oriented
- to act responsibly and in a target group and as otherwise required by the project in interactive situations

AT00CZ02 Applied environmental projects 3: 5 ECTS

Learning outcomes
The student is able to:
- use the concepts related to the project in a coherent and justify their actions on the basis of the knowledge base
- find starting points, needs and criteria for project activities
- to act purposefully, to assess the activity and make suggestions for improvement
- applied to the project a variety of different techniques, methods and ways of working
- operate safely, ethically and customer-oriented
- to act responsibly and in a target group and as otherwise required by the project in interactive situations

TLTIKTEC25KV-1013 Sustainable Solutions Engineering: 0 ECTS

TLTIKTEC25KV-1014 Sustainable Energy Management: 15 ECTS

TLTIKTEC25KV-1015 Environmental, Quality and Project Management: 15 ECTS

TLTIKTEC25KV-1016 Circular Economy Co-Creation Hubs: 15 ECTS

TLTIKTEC25KV-1017 Digital Tools for Circular Economy: 15 ECTS

TLTIKTEC25KV-1018 Sustainable Industrial Management: 15 ECTS

TLTIKTEC25KV-1019 Sustainable Sludge and Water Management: 15 ECTS

TLTIKTEC25KV-1020 Wood Technology: 0 ECTS

TLTIKTEC25KV-1048 Basic studies in Wood Engineering: 15 ECTS

AT00BZ06 Wood Construction: 5 ECTS

Learning outcomes
Student is able to:
-describe the structure of wood at the level of cell wall
-describe specific features of the interaction between wood and moisture
-describe how the structure of wood affects its properties
-take special characteristics of the wood into consideration in its various uses
-manage the basics of the manufacturing processes of the most common wood products

AT00BZ04 Glueing: 5 ECTS

Learning outcomes
The student is able to:
- describe the basic phenomena (chemistry) affecting wood gluing
- define the factors influencing gluing
- compare the properties of the most common wood glues
- choose a suitable adhesive for different applications

AT00BZ05 Surface Treatment: 5 ECTS

Learning outcomes
The student is able to:
- describe basic phenomena related to wood surface treatment (chemistry)
- pre-treat the wood surface
- compare the properties of surface treatment agents and application and drying methods
- taking into account environmental and occupational safety aspects
- use film coating methods

TLTIKTEC25KV-1022 Basics of Wood and Biotechnology: 15 ECTS

TLTIKTEC25KV-1049 Sawmill Industry: 15 ECTS

AT00BZ02 Forest and Raw Materials: 5 ECTS

Learning outcomes
The student is able to:
- basics related to tree growth and harvesting
- evaluate the use of wood as a renewable natural material
- evaluate the ecological impact of wood use

- Describe the basic structure of the tree
- describe the structure of a tree at the cellular level

AT00DD38 Sawmill Industry and Further Processing: 5 ECTS

Learning outcomes
The student is able to:
- understand the basics of the sawmill industry, Finland's forests, and forestry
- understand the basics of wood raw materials and procurement
- understand forest certification in trade (PEFC & FSC)
- understand the manufacturing and production planning processes of sawn timber
- understand value-added wood products
- understand the sales and marketing of wood products
- understand logistics and Incoterms clauses
- understand R&D - the development of wood products over the years
- understand the use of wood in construction.

AT00DC80 Drying and Thermal Modification: 5 ECTS

Learning outcomes
The student is able to:
- basics of wood drying
- Industrial wood drying and its processes
- firewood and its manufacturing process
- basic wood drying invoices
- targets for wood drying in different applications
- other methods of drying wood, drying defects

TLTIKTEC25KV-1050 Panel Products and Engineered Wood Products: 15 ECTS

AT00DC81 Plywood and LVL Industries: 5 ECTS

Learning outcomes
The student is able to
- understand the manufacturing processes of plywood and LVL (Laminated Veneer Lumber) panel products
- understand the main applications of different panel types
- define the technical properties of various panel types
- understand the further processing possibilities of different panel types.
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AT00DC82 Joinery Industry: 5 ECTS

Learning outcomes
The student is able to:
- identify the main wood-based construction products and their manufacturing processes
- identify the main wood-based interior products and their manufacturing processes

- understand the principles of designing, using, installing, and maintaining wood-based products.

AT00DC83 Other Engineered Wood Products: 5 ECTS

Learning outcomes
The student is able to:
- understand the manufacturing processes of particleboard, MDF, OSB, and CLT panel products
- know the main applications of each panel type
- define the technical properties of different panel types
- know the further processing possibilities of various panel types.

TLTIKTEC25KV-1051 Furniture Industry: 15 ECTS

AT00DC85 Woodworking and Work Safety: 5 ECTS

Learning outcomes
The student is able to:
- describe the basics related to woodworking
- describe the machines and equipment used for woodworking
- choose appropriate machining methods for different stages of product manufacturing
- operate laboratory machines in accordance with safety regulations
- follow the organization's safety instructions in laboratory environments.

AT00BZ15 Furniture Industry: 5 ECTS

Learning outcomes
Student is able to:
- describe the operating environment of the furniture industry
- evaluate the operational strategies of companies in the sector
- describe products and their production methods in the furniture industry
- name Finnish furniture designers and their products
- analyze the Finnish furniture industry and its future

AT00BZ16 Industrial Processes and Production: 5 ECTS

Learning outcomes
Student is able to:
- name the various production processes of the furniture industry
- describe production planning and control methods
- discuss the importance of different factors of production as part of layout design
- describe the principles of lean thinking and activities
- describe the principles of investment accounting and its significance for the company's profitability

TLTIKTEC25KV-1026 Biomaterials and Food Technology: 0 ECTS

TLTIKTEC25KV-1033 Urban Planning: 0 ECTS

TLTIKTEC25KV-1034 Development of Residential Environments: 15 ECTS

TLTIKTEC25KV-1035 Municipality as an Operating Environment: 15 ECTS

AT00BY93 Municipality as an Operating Environment: 5 ECTS

Learning outcomes
The student can
- acquire information on the regional administration reform and understands its impact on the municipalities
- understand the principles of a municipality as an operating environment and the appropriate decision-making principles
- understand starting points for general level planning and knows how to prepare and structure information on and
for master plans
- create development plans based on municipal needs

AT00BY94 Development project of municipality: 10 ECTS

Learning outcomes
The student can
- apply planning software to illustrate structured or created information
- acquire knowledge and create a report for the basis of a development project and make use of geographical data
- observe the site considering the environmental aspects
- prepare development suggestions in a project based on reviews and acquired data

TLTIKTEC25KV-1036 Elective Studies: 0 ECTS

TLTIKTEC25KV-1037 Business and Production Economy: 15 ECTS

AT00DA77 Business Operations in the Technology Industry: 15 ECTS

Learning outcomes
The course is mainly intended for engineering students. The aim of the course is for the student to be able to
- the basics of cash flow in industrial companies
- examine the products and operations of industrial companies from a customer-oriented perspective
- evaluate different management methods and their impact on corporate culture
- evaluate and develop industrial companies' internal logistics and aspects related to the supply chain
- evaluate the significance of the development of different areas in order to achieve the goals of industrial companies.

TLTIKTEC25KV-1038 From data to machine learning: 15 ECTS

AT00BY42 Data analysis and visualization: 10 ECTS

Learning outcomes
The student is able to
- utilize mathematical methods to analyze and to predict phenomena
- utilize a modern statistical tool
- visualize data to identify its properties, analysis interpretation and to facilitate further processing

AT00BY43 Machine Learning: 5 ECTS

Learning outcomes
The student is able to
- take advantage of both supervised and unsupervised machine learning in an appropriate way
- implement the fitting of the machine learning model
- take advantage of the supply of cloud services
- take into account the ethical guidelines of the authorities and the technology industry
- make use of existing machine learning ecosystems and equipment

TLTIKTEC25KV-1039 Basics of construction: 30 ECTS

AT00CB13 Construction materials: 5 ECTS

Learning outcomes
The student identifies the basic materials, basic characteristics and uses of building construction and infrastructure construction.
The student understands the effects of the properties and uses of building materials in construction and is able to utilise what they have learned in new situations. The student understands the basic concepts of chemistry related to building materials and the chemical phenomena that describe them. The student acquaints themselves with the usefulness of construction waste materials from the point of view of chemistry. The student recognises the principles of sustainable development.

AT00CB14 Concrete technics I: 4 ECTS

Learning outcomes
The student is able to design the composition of conventional concrete so that it meets the requirements for fresh and hardened concrete. Can produce conventional concrete according to plans. Can test the quality properties of concrete and evaluate the suitability of concrete mass. Understand the effect of different factors on the properties of concrete mass and hardened concrete. Understands the principles of concrete mass adjustment.

AT00CB15 Basics of Building Engineering: 5 ECTS

Learning outcomes
The student understands the whole of the parts of a building and their main functions. The student is familiar with the options for the outer shell, surfaces and non-load-bearing structures as well as the complementary building components. The student understands the most important concepts of fire

safety in buildings and the principles of moisture insulation. The student is familiar with the most common markings and permit practices in the construction industry. The student knows the basics of computer-aided designing.

AT00CB16 Basics of Civil Engineering: 5 ECTS

Learning outcomes
The student knows the different elements of the built environment, the related research and how they relate to each other. The student knows the different stages of zoning and understands the importance of zoning as the basis for all construction. The student is familiar with environmental problems and related legislation. The student is able to take into account the principles of sustainable development in the design and implementation of the built environment. The student gets acquainted with BIM + CAD-based design software.

AT00CB17 Basics of Surveying Technique: 3 ECTS

Learning outcomes
The student knows the basics of geometric measurements in construction and the processes of building measurements, and is familiar with the most common measuring instruments. The student masters the practice of mapping and marking measurement. The student is able to process measurement data.

AT00CB18 Geotechnics: 3 ECTS

Learning outcomes
The student knows the typical geological soil layers and how they are created. The student can name the soil types according to both the geotechnical soil classification and the Eurocodes.
The student knows the concepts and phenomena as well as copes with simple calculations related to soil types,structural properties, hydraulic properties, groundwater and other moisture, frost and frosting.
The student knows the most common soil and laboratory studies and identifies the initial data needed in geotechnical design.

AT00CB19 Earthwork Engineering and Rock Excavation: 5 ECTS

Learning outcomes
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.
The student understands and is able to plan the implementation of opencast mining and knows the legislation and safety instructions related to mining.

TLTIKTEC25KV-1040 Civil engineering II: 15 ECTS

AT00CD36 Hydrology and Hydraulic Engineering: 3 ECTS

Learning outcomes
The student understands the quantities of hydrology and masters their measurement methods, is able to interpret observational data and acquire the initial data required for construction projects. The student understands the principles of hydrostatics and the dimensioning and calculation of losses in pipes and open streams, is able to perform simple dimensioning tasks and understands how discharge is conducted from openings and overflow dams.

AT00CZ28 Rock construction technique: 5 ECTS

Learning outcomes
The student
- knows properties of bedrock and understands how they affect execution of a rock construction project.
- recognizes the principles of rock construction design and dimensioning as well as different methods for rock excavation, rock support and rock grouting, and can apply the knowledge in a sustainable way.

AT00CD38 Network Engineering: 3 ECTS

Learning outcomes
The student knows the methods of new construction and renovation of the water supply network and the materials used for them. The student is able to take into account the occupational safety aspects of building a water supply network.

AT00CZ19 Network design: 4 ECTS

Learning outcomes
The student is able to design a simple water supply network and choose suitable devices and equipment for it, and is able to place structures in a design environment.

TLTIKTEC25KV-1041 Civil engineering III: 15 ECTS

AT00CD40 Intersections and Transportation Systems: 3 ECTS

Learning outcomes
The student understands the connection between traffic and land use, the basics of traffic studies and the variations in traffic. He knows the factors that affect traffic safety as well as the basics of traffic management. The student is familiar with the intersection types and is able to design an at-grade intersection.

AT00CD41 Environmental Geotechnology: 3 ECTS

Learning outcomes
The student develops geotechnical thinking and problem solving skills; adopts information retrieval methods and presentation skills in the field; knows the importance of the soil in zoning; adopts the basics of environmental geotechnical design and construction.

AT00CD42 Maintenance of Infrastructure: 3 ECTS

Learning outcomes
The student is familiar with the life cycle thinking of traffic routes and is able to apply it to traffic route maintenance. The student knows the mechanisms of damage to superstructures and the main principles of care and renovation.

AT00CD43 Surveying Technology and Automative Machinery: 3 ECTS

Learning outcomes
The student knows the main regulations and instructions for infrastructure measurement as well as typical site measurements. The student knows the basics of machine control modelling and laser scanning.

KTE2190 Basics of Bridges Engineering: 3 ECTS

Learning outcomes
The student knows the different types of bridges and their applications: they can use tables to dimension bridge loads, are able to draft a general drawing of a bridge, they identify bridge construction methods and and are able to formwork, construct scaffolding and conduct reinforcement work, they know the quality requirements of bridges and master maintenance and repair work.