Curriculum at LAB University of Applied Sciences
2021-2022

Bachelor of Engineering, Energy and Environmental Engineering 21S, full-time studies, Lahti

Code	Name	1 y	2 y	3 y	4 y	ECTS total
EYM21SLTI-1001	**Common studies**					**15**
AY00BU56	Developing professional competence 1	1				1
AY00BU57	Developing professional competence 2		1			1
AY00CQ07	Developing professional competence 1			1		1
A300CQ54	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
EYM21SLTI-1002	**Professional Core Competence**					**120**
EYM21SLTI-1003	**Basics of mathematics and physics**					**15**
AT00BT67	Basic studies in mathematics	3				3
AT00BT68	Mathematics in Technology 1	3				3
AT00BT69	Mathematics in Technology 2		3			3
AT00BT70	Basic studies in physics	3				3
AT00BY87	Physics of enviromental engineering	3				3
EYM21SLTI-1004	**Environmental inventoring and monitoring**					**15**
AT00BY63	Laboratory and calculation exercises of physics		3			3
AT00BY64	Laboratory and calculation exercises of chemistry	2				2
AT00BY65	Environmental inventories		5			5
AT00BY66	Environmental chemistry and sampling		5			5
EYM21SLTI-1005	**Basics of energy and environmental engineering**					**15**
AT00BY67	Ecosystems and climate change	5				5
AT00BY68	Water and energy management	5				5
AT00BY69	Polluted soil and waste management	5				5
EYM21SLTI-1006	**Communities and environment**					**15**
AT00BY70	Sustainable urban structure and land use	6				6
AT00BY71	Environmental Legislation and Administration	3				3
AT00BY72	Geographic data	3				3
AT00BY73	Computer-aided Design	3				3
EYM21SLTI-1007	**Circular economy, community and mobility**					**15**

AT00BY74	Climate change and thermal physics		3			3
AT00BY75	Mobility and community		6			6
AT00BY76	Consumer behavior		2			2
AT00BY77	Environmental Impact Assessment		4			4
EYM21SLTI-1008	**Material and environmental efficiency**					**15**
AT00BY78	Material and energy efficiency in enterprises		5			5
AT00BY79	Industrial symbioses and recycling processes		5			5
AT00BY80	Water management		5			5
EYM21SLTI-1009	**Sustainable energy management**					**15**
AT00BY81	Energy efficiency		5			5
AT00BY82	Renewable Energy Forms		5			5
AT00BY83	Sustainable Resource Efficiency Project		5			5
EYM21SLTI-1010	**Development of residential environments**					**15**
AT00BY84	Development of residential environments		5			5
AT00BY85	Town planning		5			5
AT00BY86	Planning Residential Surroundings		5			5
EYM21SLTI-1011	**Municipality as an Operating Environment**					**15**
AT00BY93	Municipality as an Operating Environment			5		5
AT00BY94	Development project of municipality			10		10
EYM21SLTI-1012	**Research methods and applied projects**					**15**
AT00BY97	Research methods and reporting			5		5
AT00BY98	Applied urban planning and environmental project			5		5
AT00BY99	Applied environmental projects			5		5
EYM21SLTI-1013	**Complementary Competence**					**60**
EYM21SLTI-1014	**Digitalisation in circular economy**					**15**
AT00BV34	Digital Tools			5		5
AT00BY95	Applied data analysis, calculation programmes and GIS			5		5
AT00BY96	Digitalisation in circular economy - applied projects			5		5
EYM21SLTI-1015	**Enviromental, quality and project management**					**15**
AT00BY88	EHQS-systems, standards and auditing			5		5
AT00BY89	CSR-reporting, models and practices			5		5
AT00BY90	Project and risk management			5		5
EYM21SLTI-1016	**Sustainable control of operations**					**15**
AT00BY91	Responsible Business and Marketing					0
AT00BY92	Sustainable Operations Control					0
AT00BZ38	Management and Quality					0
EYM21SLTI-1017	**Practical Training**					**30**
HA00CD55	Practical Training		10			10
HA00BU60	Practical Training 2			10		10
HA00BU61	Practical Training 3				10	10

EYM21SLTI-1018 Thesis						15
AO00BU62	Thesis Planning			5		5
AO00BU63	Thesis Project				5	5
AO00BU64	Thesis Report				5	5

EYM21SLTI-1001 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

AY00CQ07 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 career path 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

A300CQ54 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.

EYM21SLTI-1002 Professional Core Competence: 120 ECTS

EYM21SLTI-1003 Basics of mathematics and physics: 15 ECTS

AT00BT67 Basic studies in mathematics: 3 ECTS

Learning outcomes
Student is able to
- calculate and simulate mathematical expressions
- solve geometric and trigonometric problems

AT00BT68 Mathematics in Technology 1: 3 ECTS

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

AT00BT69 Mathematics in Technology 2: 3 ECTS

Learning outcomes
Student is able to
- solve challenging functions
- solve basic derivation functions and utilise derivation in practice
- solve integrated polynomial functions and utilise integration in practice
- solve trigonometrical problems

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

AT00BY87 Physics of enviromental engineering: 3 ECTS

Learning outcomes
The student can
- describe electrical phenomena behind technological development
- mathematically solve problems related to electricity and the decibel scale

- apply digital solutions to electricity-related phenomena
- describe noise control problems from the perspective of wave motion theory

EYM21SLTI-1004 Environmental inventoring and monitoring: 15 ECTS

AT00BY63 Laboratory and calculation exercises of physics: 3 ECTS

Learning outcomes
The student can
- Conduct physical measurements and draft a proper report on their findings
- Perform result processing, graphical representations, and error checking
- Describe physics as an experimental natural science
- Conduct noise and radon measurements and understand related calculations and theory

AT00BY64 Laboratory and calculation exercises of chemistry: 2 ECTS

Learning outcomes
The student can
- Calculate reaction energies and understands the basics of thermochemistry
- Outlines the basics of combustion and makes flue gas calculations using combustion reactions
- Uses a voltage range of metals in electrochemistry and understands in practice the basics of oxidation reduction reactions
and corrosion
- Calculate basic calculations related to acids and alkalis, and understands in practice the basics of pH measurement, acid-alkali titration and neutralisation

AT00BY65 Environmental inventories: 5 ECTS

Learning outcomes
The student can
- Recognise the most important biotopes (forest types, key biotopes, etc.)
- Find information on previously conducted environmental inventories and conservation programmes
- Recognises the key values related to the built environment
- Draft a small-scale inventory of a cultural environment
- Find information on completed inventories of cultural environments

AT00BY66 Environmental chemistry and sampling: 5 ECTS

Learning outcomes
The student can
- Name inorganic and organic compounds
- Combine the importance of functional groups with the properties and behaviour of environmental contaminants
in different environmental matrices
- Apply properties of contaminants in the examination of representative sampling
- Use samplers and field gauges / equipment commonly used in environmental sampling

EYM21SLTI-1005 Basics of energy and environmental engineering: 15 ECTS

AT00BY67 Ecosystems and climate change: 5 ECTS

Learning outcomes
The student:
- knows the key principles on ecosystems and nutrient cycles
- can identify human impacts on ecosystems, in particular the causes and consequences of climate change
- can identify ecosystem services and can consider their social impacts

AT00BY68 Water and energy management: 5 ECTS

Learning outcomes
- basic principles of sustainable water and energy supply opportunities and the most common technologies
- interpret the importance of sustainable, secure and economic water and energy supply as part of societal activities
- recognises the impact of climate change on water and energy supply, and the impacts of energy management in climate change

AT00BY69 Polluted soil and waste management: 5 ECTS

Learning outcomes
The student knows:
- the key governance and regulation in the sector
- the background of the impact of the circular economy as part of sustainable waste management solutions
- how to identify key sources of emissions that cause soil and groundwater pollution
- the main principles and key process principles for assessing the need for soil remediation

EYM21SLTI-1006 Communities and environment: 15 ECTS

AT00BY70 Sustainable urban structure and land use: 6 ECTS

Learning outcomes
The student can
- Describe a land use planning system
- Define the key features of a sustainable community
- Apply what they learned in a small-scale project

AT00BY71 Environmental Legislation and Administration: 3 ECTS

Learning outcomes
- 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

AT00BY72 Geographic data: 3 ECTS

Learning outcomes
The student can
- select geographical data applications
- use an applied geographical data software
- make use of the software when conducting environmental inventories and planning projects

AT00BY73 Computer-aided Design: 3 ECTS

Learning outcomes
The student can
- define the possibilities of using software in planning
- use the key features of the software
- create simple drawings on the software

EYM21SLTI-1007 Circular economy, community and mobility: 15 ECTS

AT00BY74 Climate change and thermal physics: 3 ECTS

Learning outcomes
The student can
- describe physical phenomena behind climate change
- mathematically solve problems related to heat, energy and transport phenomena

AT00BY75 Mobility and community: 6 ECTS

Learning outcomes
The student can
- define the impacts of climate change on various societies
- the basics of a transport planning system and transport planning
- calculate the reduction of municipal emissions (including traffic) in various circumstances

AT00BY76 Consumer behavior: 2 ECTS

Learning outcomes
The aim of the course is to make students think of their own lifestyle habits and identify areas where they could reduce their consumption of natural resources. Opportunities to reach CO2 emissions targets in different circumstances are introduced and researched.

AT00BY77 Environmental Impact Assessment: 4 ECTS

Learning outcomes
The student
- understands the decrees and goals of environmental impact assessments
- can describe the progress of the environmental impact assessment procedure at project level and the commonly used assessment methods
- describe the participatory procedures involved in the process and the factors influencing their success
- identify and report on environmental impact assessment projects.

EYM21SLTI-1008 Material and environmental efficiency: 15 ECTS

AT00BY78 Material and energy efficiency in enterprises: 5 ECTS

Learning outcomes
The student can
- knows the basics for developing material and energy efficiency
- the basic solutions and practices of the development of material and energy efficiency
- can conduct a material and energy review
- draft a material flow analysis for a company

AT00BY79 Industrial symbioses and recycling processes: 5 ECTS

Learning outcomes
The student:
- understands the significance of industrial symbioses and material recycling processes and practices as part of a circular economy
- promotes industrial symbioses between companies
- knows the general industrial recycling processes for materials and their technical solutions
- can determine the key operators of the recycling industry and current development issues

AT00BY80 Water management: 5 ECTS

Learning outcomes
The student can
- use professional water supply terms in a consistent way
- choose appropriate water and waste management systems in sparsely populated areas and dense settlements
- apply planning and risk assessment methods related to the water supply chain
- take into account the principles of energy efficiency as part of water supply

EYM21SLTI-1009 : 15 ECTS

AT00BY81 Energy efficiency: 5 ECTS

Learning outcomes
The student is able to

- identify the main aspects of the different stages of the energy chain (acquisition, production and consumption)
- regognize different methods and technologies to promote energy efficiency and security of supply, and knows their significance at the local and global level
- describe the role of digitalisation as part of energy efficient solutions now and in the future
- utilise different tools when assessing and comparing energy efficiency and more sustainable energy forms, for example in energy consulting

AT00BY82 Renewable Energy Forms: 5 ECTS

Learning outcomes
The student is able to
- describe how different forms of renewable energy are generated and the targets set for their increased use
- regognize the main concepts connected with decentralized energy production and the related targets
- compare the environmental and cost impacts of different forms of energy and to evaluate their suitability for different uses

AT00BY83 Sustainable Resource Efficiency Project: 5 ECTS

Learning outcomes
The student is able to
- descripe how to search and apply information required to carry out resource efficiency and water management -related projects
- choose the most suitable methods to perform different energy-related assignments
- act as a responsible member of a team, and to present and report on a project according to the reporting guidelines of University

EYM21SLTI-1010 : 15 ECTS

AT00BY84 Development of residential environments: 5 ECTS

Learning outcomes
The student can
- Create a development plan for a residential environment and plan it with the most commonly used building types
- Create a description and illustrations of the environment
- Apply suitable software for the work

AT00BY85 Town planning: 5 ECTS

Learning outcomes
The student can
- structure the different stages of the town planning process
- prepare an urban area development map of the residential area with its provisions, an area development report and prepare

building system instructions for the area
- apply suitable software for the work

AT00BY86 Planning Residential Surroundings: 5 ECTS

Learning outcomes
The student can
- prepare and scale a plan for the surroundings of a residential area
- consider the green environment and handling of rainwater in the area
- apply suitable software for the work

EYM21SLTI-1011 : 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

EYM21SLTI-1012 Research methods and applied projects: 15 ECTS

AT00BY97 Research methods and reporting: 5 ECTS

Learning outcomes
The student can
- acquire, apply and evaluate data related to research and development activities
with source-criticism
- follow ethical principles in research activities
- apply the most typical research and development methods of their field
- write a scientific report applying appropriate language, style and references

AT00BY98 Applied urban planning and environmental project: 5 ECTS

Learning outcomes
The student can:
- use project-related concepts consistently and can justify their actions based on data
- review the starting points, needs and rationale of a project
- work in a goal-oriented way, evaluate operations and make development suggestions
- apply various techniques and working methods to projects
- operate safely, ethically and in a customer-oriented way
- operate responsibly and in a goal-oriented manner within a group and in other situations requiring interaction during projects
- create a presentation of a practical project using digital medial elements

AT00BY99 Applied environmental projects: 5 ECTS

Learning outcomes
The student is able to
- operate in a work-related project alone or in a small team
- apply different kinds of information search and development methods
- write a report following the thesis guidelines and present the results according to the instructions

EYM21SLTI-1013 Complementary Competence: 60 ECTS

EYM21SLTI-1014 Digitalisation in circular economy: 15 ECTS

AT00BV34 Digital Tools: 5 ECTS

Learning outcomes
Student is able to
- work in a virtual learning environment
- make reports and analyses with the help of wordprocessing and spreadheet calculation software
- use correct cloud environment individually and in a group
- carry out digital project presentation

AT00BY95 Applied data analysis, calculation programmes and GIS: 5 ECTS

Learning outcomes
The student can:
- find information from data sources in the subject area
- use the most important tools and programmes used in their professional field
- use various calculation programmes and tools and can apply them in various field or theme specific tasks

AT00BY96 Digitalisation in circular economy - applied projects: 5 ECTS

Learning outcomes
The student can
- apply digital tools in circular economy development projects
- act as a responsible team member and apply digital / online tools in project management
- create a digital online publication on a practical project

EYM21SLTI-1015 : 15 ECTS

AT00BY88 EHQS-systems, standards and auditing: 5 ECTS

Learning outcomes
The student is able to
- apply commonly used EHQS –standards (ISO SERIE AND EMAS) and tools
- apply company level managemengt system solutions
- implement auditing processes

AT00BY89 CSR-reporting, models and practices: 5 ECTS

Learning outcomes
The student is able to:
- apply commonly used environmental and sustainability certificates and labels
- report guidelines and standards, measures and practices
- create measures to manage resource and environmental efficiency and CSR -development of the company

AT00BY90 Project and risk management: 5 ECTS

Learning outcomes
The student is able to:
- understand the signification of the risk management in different administrative and industrial sectors
- identify, evaluate, quantify and monitor potential risks
- make suggestions for risk avoidance and reductions
- project management tools in efficient project management

EYM21SLTI-1016 Sustainable control of operations: 15 ECTS

AT00BY91 Responsible Business and Marketing: 5 ECTS

Learning outcomes
The student
- understands the basics of financial transactions and its significance in business activities
- review the products and operations of a business in a customer-focused way
- evaluate the importance of the development of various aspects of responsible business in the company's
financial transactions

AT00BY92 Sustainable Operations Control: 5 ECTS

Learning outcomes
The student is able to
- analyse and develop internal logistics
- analyse and develop the components of the supply chain

AT00BZ38 Management and Quality: 5 ECTS

Learning outcomes
The student
- understands the agreements and regulations related to the running of a business
- evaluate various management methods and their significance
- understands the importance of quality

EYM21SLTI-1017 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

EYM21SLTI-1018 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.