

**Curriculum at LAB University of Applied Sciences  
2020-2021**

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

Code	Name	1 y	2 y	3 y	4 y	ECTS total
<b>EYM20SLTI-1001 Common studies</b>						<b>15</b>
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
<b>EYM20SLTI-1002 Professional Core Competence</b>						<b>120</b>
<b>EYM20SLTI-1013 Basics of mathematics and physics</b>						<b>15</b>
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 environmental engineering	3				3
<b>EYM20SLTI-1006 Environmental inventoring and monitoring</b>						<b>15</b>
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
<b>EYM20SLTI-1007 Basics of energy and environmental engineering</b>						<b>15</b>
AT00BY67	Ecosystems and climate change	5				5
AT00BY68	Water and energy management	5				5
AT00BY69	Polluted soil and waste management	5				5
<b>EYM20SLTI-1008 Communities and environment</b>						<b>15</b>
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
<b>EYM20SLTI-1009 Circular economy, community and mobility</b>						<b>15</b>

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
<b>EYM20SLTI-1010 Material and environmental efficiency</b>					<b>15</b>
AT00BY78	Material and energy efficiency in enterprises		5		5
AT00BY79	Industrial symbioses and recycling processes		5		5
AT00BY80	Water management		5		5
<b>EYM20SLTI-1011 Sustainable energy management</b>					<b>15</b>
AT00BY81	Energy efficiency		5		5
AT00BY82	Renewable Energy Forms		5		5
AT00BY83	Sustainable Resource Efficiency Project		5		5
<b>EYM20SLTI-1012 Development of residential environments</b>					<b>15</b>
AT00BY84	Development of residential environments		5		5
AT00BY85	Town planning		5		5
AT00BY86	Planning Residential Surroundings		5		5
<b>EYM20SLTI-1016 Municipality as an Operating Environment</b>					<b>15</b>
AT00BY93	Municipality as an Operating Environment		5		5
AT00BY94	Development project of municipality		10		10
<b>EYM20SLTI-1018 Research methods and applied projects</b>					<b>15</b>
AT00BY97	Research methods and reporting		5		5
AT00BY98	Applied urban planning and environmental project		5		5
AT00BY99	Applied environmental projects		5		5
<b>EYM20SLTI-1003 Complementary Competence</b>					<b>60</b>
<b>EYM20SLTI-1017 Digitalisation in circular economy</b>					<b>15</b>
AT00BV34	Digital Tools		5		5
AT00BY95	Applied data analysis, calculation programmes and GIS		5		5
AT00BY96	Digitalisation in circular economy - applied projects		5		5
<b>EYM20SLTI-1014 Enviromental, quality and project management</b>					<b>15</b>
AT00BY88	EHQS-systems, standards and auditing		5		5
AT00BY89	CSR-reporting, models and practices		5		5
AT00BY90	Project and risk management		5		5
<b>EYM20SLTI-1019 Sustainable control of operations</b>					<b>15</b>
AT00BY91	Responsible Business and Marketing				0
AT00BY92	Sustainable Operations Control				0
AT00BZ38	Management and Quality				0
<b>EYM20SLTI-1004 Practical Training</b>					<b>30</b>
HA00BU59	Practical Training 1				0
HA00BU60	Practical Training 2				0
HA00BU61	Practical Training 3				0

<b>EYM20SLTI-1005 Thesis</b>						<b>15</b>	
AO00BU62	Thesis Planning				5	5	
AO00BU63	Thesis Project				5	5	
AO00BU64	Thesis Report				5	5	

### **EYM20SLTI-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

#### **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 competencies during 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.

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**EYM20SLTI-1002 Professional Core Competence: 120 ECTS****EYM20SLTI-1013 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:

- recognise 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 environmental 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

### **EYM20SLTI-1006 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

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**EYM20SLTI-1007 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

**EYM20SLTI-1008 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

### **EYM20SLTI-1009 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.

**EYM20SLTI-1010 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
- knows the practices of 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

**EYM20SLTI-1011 : 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)
- recognize 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
- recognize 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

- describe 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

## **EYM20SLTI-1012 : 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

### **EYM20SLTI-1016 : 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

### **EYM20SLTI-1018 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

**EYM20SLTI-1003 Complementary Competence: 60 ECTS****EYM20SLTI-1017 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 spreadsheet 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

**EYM20SLTI-1014 : 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 management 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

**EYM20SLTI-1019 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

**EYM20SLTI-1004 Practical Training: 30 ECTS****HA00BU59 Practical Training 1: 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

**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 in 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 into the work done in practical training

### **EYM20SLTI-1005 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.