

**Curriculum at LAB University of Applied Sciences  
2023-2024**

**Bachelor of Engineering, Sustainable Solutions Engineering  
23S, online studies**

Code	Name	1 y	2 y	3 y	4 y	ECTS total
<b>TLTISSE23SV-1019 CORE COMPETENCE</b>						<b>141</b>
<b>TLTISSE23SV-1001 Common Studies</b>						<b>15</b>
AY00CE71	Developing Professional Competences 1	3				3
AY00CE72	Developing Professional Competences 2		1			1
AY00CE73	Developing Professional Competences 3			1		1
A300CE13	Orientation to Sustainability Thinking	2				2
KE00CE74	Intercultural Awareness	3				3
KE00CE75	English for Professional Communication	5				5
<b>TLTISSE23SV-1002 Professional Core Competence</b>						<b>81</b>
<b>TLTISSE23SV-1003 Transferable competences</b>						<b>6</b>
KS00BT59	Expert Communication Skills	4				4
KR00BU42	Swedish for Work, Spoken	1				1
KR00BU43	Swedish for Work, Written	1				1
KIEN0018	English Pronunciation	1				1
KE00CH94	Diversity Management and Global Citizenship	5				5
<b>TLTISSE23SV-1004 Basics of STEM</b>						<b>15</b>
AT00CH47	Basic studies in mathematics	3				3
AT00CH48	Mathematics in Technology 1	3				3
AT00CH49	Mathematics in Technology 2		3			3
AT00CH50	Basic Studies in Physics	3				3
AT00CH93	Basic Studies in Chemistry	3				3
<b>TLTISSE23SV-1005 Environmental and Technological Cycles</b>						<b>15</b>
AT00CH96	Environmental Cycles	5				5
AT00CH97	Technological Cycles	5				5
AT00CH98	Climate Change and Sustainability	5				5
<b>TLTISSE23SV-1006 Environmental Technologies and Management</b>						<b>15</b>
AT00CK02	Environmental Technologies	5				5
AT00CK03	Sustainable Process Engineering	5				5
AT00CK04	Environmental Science and Monitoring	5				5
<b>TLTISSE23SV-1007 Environmental Impact and Water Management</b>						<b>15</b>
AT00CV16	Environmental Impact Assessment		5			5

AT00CK09	Environmental Legislation and Policies		5		5
AT00CK10	Sustainable Water Management		5		5
<b>TLTISSE23SV-1008</b>	<b>Research Methods, Sustainability Literature and Applied Projects</b>				<b>15</b>
AT00CK26	Research Methods and Reporting		5		5
AT00CK27	Applied Circular Economy Projects			5	5
AT00CV17	Sustainability Literature Reviews	5			5
<b>TLTISSE23SV-1017</b>	<b>Practical Training</b>				<b>30</b>
HA00CE82	Practical Training			10	10
HA00CE83	Practical Training 2				10
HA00CE84	Practical Training 3				10
<b>TLTISSE23SV-1018</b>	<b>Thesis</b>				<b>15</b>
AO00CE85	Thesis Planning			5	5
AO00CE86	Thesis Research and Writing				5
AO00CE87	Thesis Publication				5
<b>TLTISSE23SV-1009</b>	<b>COMPLEMENTARY COMPETENCE</b>				<b>99</b>
<b>TLTISSE23SV-1010</b>	<b>Circular Economy Co-Creation Hubs</b>				<b>0</b>
AT00CK18	Career and Business Idea Development			5	5
AT00CK17	Laboratories for Sustainable Material Cycles			5	5
AT00CK19	Circular Economy RDI-projects			5	5
<b>TLTISSE23SV-1011</b>	<b>Sustainable Material Management</b>				<b>0</b>
AT00CK11	Circular Economy, Recycling and Waste Management		5		5
AT00CK12	Material Efficiency and Sustainable Materials		5		5
AT00CK13	Sustainable Life Cycle of Product		5		5
<b>TLTISSE23SV-1012</b>	<b>Sustainable energy management</b>				<b>0</b>
AT00BY81	Energy efficiency		5		5
AT00BY82	Renewable Energy Forms		5		5
AT00BY83	Sustainable Resource Efficiency Project		5		5
<b>TLTISSE23SV-1013</b>	<b>Digital Tools for Circular Economy</b>				<b>0</b>
AT00CV45	Digital technologies as enablers of circular economy		5		5
AT00CK15	Applied Data-Analyses and Environmental Modelling		5		5
AT00CK16	Applied Projects		5		5
<b>TLTISSE23SV-1014</b>	<b>Environmental, Health, Quality and Security Management</b>				<b>0</b>
AT00CV43	Quality management systems, Standards and Auditing			5	5
AT00CV44	Sustainability Reporting and Verifications			5	5
AT00BY90	Project and risk management			5	5
<b>TLTISSE23SV-1016</b>	<b>Exchange Studies</b>				<b>0</b>

**TLTISSE23SV-1019 CORE COMPETENCE: 141 ECTS**

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## **TLTISSE23SV-1001 Common Studies: 15 ECTS**

### **AY00CE71 Developing Professional Competences 1: 3 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

### **AY00CE72 Developing Professional Competences 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

### **AY00CE73 Developing Professional Competences 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

### **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.

**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.

**TLTISSE23SV-1002 Professional Core Competence: 81 ECTS****TLTISSE23SV-1003 Transferable competences: 6 ECTS****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.

**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.

### **KIEN0018 English Pronunciation: 1 ECTS**

#### **Learning outcomes**

Students are able to pronounce English clearly and easily.

### **KE00CH94 Diversity Management and Global Citizenship: 5 ECTS**

#### **Learning outcomes**

The student is able to:

- understand different concepts of diversity and inclusion in the workplace and their impact on organizations
- understand cultural differences in management and leadership
- recognize the benefits of managing diversity in organizations
- lead diverse individuals and teams
- understand global impacts of their own actions and the importance of a global mindset in today's world.

### **TLTISSE23SV-1004 Basics of STEM: 15 ECTS**

### **AT00CH47 Basic studies in mathematics: 3 ECTS**

#### **Learning outcomes**

Student is able to

- calculate and simulate mathematical expressions
- solve geometric and trigonometric problems

### **AT00CH48 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

## **AT00CH49 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

## **AT00CH50 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

## **AT00CH93 Basic Studies in Chemistry: 3 ECTS**

### **Learning outcomes**

The student is able to

- to understand the meaning of the chemistry as an essential part of environmental engineering
- to describe and identify common inorganic compounds as well as the groups and structures of organic compounds.
- to present the basic chemical equations and reactions
- to know the atomic structure and chemical bonds, electrochemical reactions, acid and base equilibrium
- to compute basic chemical calculations

## **TLTISSE23SV-1005 Environmental and Technological Cycles: 15 ECTS**

### **AT00CH96 Environmental Cycles: 5 ECTS**

#### **Learning outcomes**

The student is able to

- to understand the principles of environmental cycles (e.g. carbon, nutrient, water and air cycle)
- to understand the importance of biodiversity in the sustainability of life
- to know the principles and methods related to ecosystem services

### **AT00CH97 Technological Cycles: 5 ECTS**

#### **Learning outcomes**

The student is able to

- to understand the principles of technical and material cycles as a part of the circular economy
- to understand the importance of responsible production and consumption of non-renewable natural resources materials

- to understand interactions of sustainable/non-sustainable production and consumption on the main future challenges like pollution, climate change, resource and nature depletion
- to know the principles and methods related to sustainable, circular economy and product & process design
- to discover wide variety of circular economy opportunities due to the examples of circular models

### **AT00CH98 Climate Change and Sustainability: 5 ECTS**

#### **Learning outcomes**

The student is able to

- to understand the principles of climate change and global warming
- to understand the mechanism of greenhouse effect and its importance for life
- to know the principles of circular economy
- to understand impacts of the use of natural resources to sustainability and climate change, resources, nature depletion
- the meaning of the Sustainable Development Goals

### **TLTISSE23SV-1006 Environmental Technologies and Management: 15 ECTS**

#### **AT00CK02 Environmental Technologies: 5 ECTS**

#### **Learning outcomes**

The student is able to

- to know the key technological solutions used for air, soil, waste, energy, water management to minimize environmental impacts
- to search information about BAT- and other advanced environmental technologies due to the BREF and other documents available
- to understand the role of the circular economy in the resource efficient industrial economy

#### **AT00CK03 Sustainable Process Engineering: 5 ECTS**

#### **Learning outcomes**

The student is able to

- to know the factors that effects on the material, energy and resource efficiency of sustainable process engineering
- to know the principles of the process engineering and product design tools taken the sustainability aspects into account ( e.g. life cycle assessment (LCA) approach)
- to use on a general level CAD/Solid Works programmes

#### **AT00CK04 Environmental Science and Monitoring: 5 ECTS**

#### **Learning outcomes**

The student is able to

- to identify the main environmentally harmful substances
- to know the basic methods (physical and chemical) to monitor and measure environmental impacts
- to know the principles of the factors affecting pollutants formation and distribution in the environment

- to compare measured values with the limit values and other regulations

## **TLTISSE23SV-1007 Environmental Impact and Water Management: 15 ECTS**

### **AT00CV16 Environmental Impact Assessment: 5 ECTS**

#### **Learning outcomes**

The student is able to

- understand the general procedures in environmental impact assessment
- understand relevant regulations and policies regarding to environmental impact assessment system for example for air, water, noise, human health.
- understand impact predictions
- use Gabi to assess the environmental impacts of a project on land, air, water, etc.
- understand the monitoring and auditing of environmental impact assessment
- to understand what the methods of impact assessment are

### **AT00CK09 Environmental Legislation and Policies: 5 ECTS**

#### **Learning outcomes**

The student is able to

- to know the most important international environmental agreements (e.g. IPCC, Green Deal, UN SDGs, EU's Circular Economy) and their consequence in operational level actions
- to understand the principles of EU's environmental regulation and legislation system
- to understand the Finnish environmental regulation and legislation system as well as their implementation as a part of the EU regulation system.

### **AT00CK10 Sustainable Water Management: 5 ECTS**

#### **Learning outcomes**

The student is able to

- to appreciate the principles of sustainable water management in a context of circular economy and sustainable development goals
- to understand the importance of hydrological cycles for maintaining environmental and societies well being
- to know the main unit processes and technologies to prevent contamination of environment due to the inefficient wastewater and sludge management
- to know the factors that effects on the selection of the purification method and plant design of the wastewater treatment

## **TLTISSE23SV-1008 Research Methods, Sustainability Literature and Applied Projects: 15 ECTS**

### **AT00CK26 Research Methods and Reporting: 5 ECTS**

#### **Learning outcomes**

The student is able to

- formulate and clarify the research topic
- formulate the research design
- use secondary data
- collect primary data through interviews
- collect primary data through questionnaires
- analyze qualitative and quantitative data
- write and present the project report

### **AT00CK27 Applied Circular Economy Projects: 5 ECTS**

#### **Learning outcomes**

The student is able to

- to use project-related concepts consistently and justify their actions in accordance with the knowledge base
- to find out the starting points, needs and criteria of the project activities
- to act purposefully, evaluate activities and make suggestions for improvement
- to apply a variety of suitable techniques, methods and working methods to the project
- to operate safely, ethically and in a customer-oriented manner

### **AT00CV17 Sustainability Literature Reviews: 5 ECTS**

#### **Learning outcomes**

The student is able to

- formulate the research question related to their topic of interest
- select and evaluate relevant studies
- understand what are the criteria to include or exclude papers
- search databases and do the keyword identification
- analyze the findings
- report the results

### **TLTISSE23SV-1017 Practical Training: 30 ECTS**

### **HA00CE82 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 into the work done in practical training

### **HA00CE83 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 into the work done in practical training

### **HA00CE84 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

### **TLTISSE23SV-1018 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.

**TLTISSE23SV-1009 COMPLEMENTARY COMPETENCE: 99 ECTS****TLTISSE23SV-1010 Circular Economy Co-Creation Hubs: 0 ECTS****AT00CK18 Career and Business Idea Development: 5 ECTS****Learning outcomes**

The student is able to

- factors influencing entrepreneurial attitude in personal, organizational and society levels
- idea and innovation development methods
- what kind of support services, tools and methods exist to develop business ideas
- what kind of circular business models exist and importance of innovation in business models
- how to make a project/business plan, start the business and plan business acceleration

**AT00CK17 Laboratories for Sustainable Material Cycles: 5 ECTS****Learning outcomes**

The student is able to

- to identify different textile fibers and plastics
- sort and treat different recyclable materials by various methods
- estimate the energy content of selected materials

**AT00CK19 Circular Economy RDI-projects: 5 ECTS****Learning outcomes**

The student is able to

- basic principles of the RDI -project and how to apply them into the real-life projects
- importance of networking, team building and management methods
- European Union's research, development and innovation (RDI) funding
- project ideation and brainstorming, how to pitch project ideas, how to carry out project and project reporting

**TLTISSE23SV-1011 Sustainable Material Management: 0 ECTS****AT00CK11 Circular Economy, Recycling and Waste Management: 5 ECTS****Learning outcomes**

The student is able to

- to understand the principles and objectives of the Circular Economy in the context of resource efficiency
- to know the benefits and solutions of zero waste approach
- to know recycling industry solutions
- to know safe energy recovery and waste management solutions

**AT00CK12 Material Efficiency and Sustainable Materials: 5 ECTS**

**Learning outcomes**

The student is able to

- to understand material flow cost accounting
- to know how material efficiency auditing works in practice
- to understand how industrial symbioses can bring added value to companies

**AT00CK13 Sustainable Life Cycle of Product: 5 ECTS****Learning outcomes**

The student is able to

- to know different sustainability evaluation frame works and models
- to know the basics and applications of life cycle analyses (LCA)
- to evaluate carbon and material footprints
- to know how to manage life cycle, sustainability elements and the foot prints of products and services

**TLTISSE23SV-1012 Sustainable energy management: 0 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 University reporting guidelines

### **TLTISSE23SV-1013 Digital Tools for Circular Economy: 0 ECTS**

### **AT00CV45 Digital technologies as enablers of circular economy: 5 ECTS**

#### **Learning outcomes**

The student is able to

- understand the role of digital technologies such as AI, IoT and blockchain in circular economy
- understand different applications of digital technologies in circular economy
- know how different companies utilize these technologies in devolving circular business models
- understand how digital platforms will enable circular economy by reducing waste and emission

### **AT00CK15 Applied Data-Analyses and Environmental Modelling: 5 ECTS**

#### **Learning outcomes**

The student is able to

- to utilize digital repositories and cloud services for professional activities
- to search for information from different data sources in the topic area
- to know the most important tools and software used in their profession
- to utilize different calculation programs and tools and apply them in different field / thematic tasks

### **AT00CK16 Applied Projects: 5 ECTS**

#### **Learning outcomes**

The student is able to

- to apply digital tools in circular economy development projects
- to act as a responsible member of the team and use digital / online tools in project management
- to make a practical project and present results in a form of a digital online publication

### **TLTISSE23SV-1014 Environmental, Health, Quality and Security Management: 0 ECTS**

### **AT00CV43 Quality management systems, Standards and Auditing: 5 ECTS**

#### **Learning outcomes**

The student is able to

- have the knowledge and understanding of ISO 9001
- understand the requirements for quality management systems based on ISO 9001
- learn how to audit a quality management system
- how to plan, perform and report quality management system audits
- sustainable product design and qualifications
- information Security frameworks

**AT00CV44 Sustainability Reporting and Verifications: 5 ECTS****Learning outcomes**

The student is able to

- understand what the main contents of sustainability reports is and what is required from companies to include in their report
- EU regulations such as EU taxonomy
- understand the Non-Financial Reporting Directive (NFRD)
- understand the forthcoming Corporate Sustainability Reporting Directive (CSRD)
- sustainability reporting in accordance with the recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD)
- know the Global Reporting Initiative (GRI) standards

**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

**TLTISSE23SV-1016 Exchange Studies: 0 ECTS**