12.10.2022

Curriculum at LAB University of Applied Sciences
2021-2022

Bachelor of Engineering, Sustainable Solutions Engineering 21S, online studies

Code	Name	1 y	2 y	3 y	4 y	ECTS total
SSE21SVLTI-1001	**Core Competences**					**15**
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
SSE21SVLTI-1002	**Professional Core Competences**					**81**
SSE21SVLTI-1006	**Transferable competences**					**6**
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
SSE21SVLTI-1007	**Basics of STEM**					**15**
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
SSE21SVLTI-1009	**Environmental and Technological Cycles**					**15**
AT00CH96	Environmental Cycles	5				5
AT00CH97	Technological Cycles	5				5
AT00CH98	Climate Change and Sustainability	5				5
SSE21SVLTI-1010	**Environmental Technologies and Management**					**15**
AT00CK02	Environmental Technologies	5				5
AT00CK03	Sustainable Process Engineering	5				5
AT00CK04	Environmental Science and Monitoring	5				5
SSE21SVLTI-1011	**Environmental Impact and Water Management**					**15**
AT00CK08	Environmental Impact Assessment		5			5
AT00CK09	Environmental Legislation and Policies		5			5

AT00CK10	Sustainable Water Management		5			5
SSE21SVLTI-1018	**Research Methods, Sustainability Literature and Applied Projects**					**15**
AT00CK26	Research Methods and Reporting		5			5
AT00CK27	Applied Circular Economy Projects			5		5
AT00CK28	Sustainability Literature Reviews	5				5
SSE21SVLTI-1003	**Complementary Competences**					**99**
SSE21SVLTI-1015	**Circular Economy Co-Creation Hubs**					**0**
AT00CK18	Career and Business Idea Development			5		5
AT00CK17	Laboratories for Sustainable Material Cycles			5		5
AT00CK19	Circular Economy RDI-projects			5		5
SSE21SVLTI-1020	**Sustainable Material Management**					**0**
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
SSE21SVLTI-1021	**Sustainable energy management**					**0**
AT00BY81	Energy efficiency		5			5
AT00BY82	Renewable Energy Forms		5			5
AT00BY83	Sustainable Resource Efficiency Project		5			5
SSE21SVLTI-1022	**Digital Tools for Circular Economy**					**0**
AT00CK14	Digital Tools and Platforms		5			5
AT00CK15	Applied Data-Analyses and Environmental Modelling		5			5
AT00CK16	Applied Projects		5			5
SSE21SVLTI-1023	**Environmental, Health, Quality and Security Management**					**0**
AT00CK20	EHQS-systems, Standards and Auditing			5		5
AT00CK21	Environmental Management Tools, Certificates and Reporting			5		5
AT00CK22	Security and Risk Management			5		5
SSE21SVLTI-1025	**Exchange Studies**					**0**
SSE21SVLTI-1004	**Practical Training**					**30**
HA00CE82	Practical Training	5	5			10
HA00CE83	Practical Training 2		5	5		10
HA00CE84	Practical Training 3			5	5	10
SSE21SVLTI-1005	**Thesis**					**15**
AO00CE85	Thesis Planning			5		5
AO00CE86	Thesis Research and Writing				5	5
AO00CE87	Thesis Publication				5	5

SSE21SVLTI-1001 Core Competences: 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.

SSE21SVLTI-1002 Professional Core Competences: 81 ECTS

SSE21SVLTI-1006 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.

SSE21SVLTI-1007 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:
- 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

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 aquations and reactions
- to know the atomic structure and chemical bonds, electrochemical reactions, acid and base equilibrium
- to compute basic chemical calculations

SSE21SVLTI-1009 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

SSE21SVLTI-1010 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

SSE21SVLTI-1011 Environmental Impact and Water Management: 15 ECTS

AT00CK08 Environmental Impact Assessment: 5 ECTS

Learning outcomes
The student is able to
- to know generally used environmental impact assessment procedures and their practical applications in different countries as part of environmental policies
- to understand typical environmental impacts related to e.g. soil construction, industrial sites, energy projects and natural resource extraction having significant environmental impacts
- to know public participation and citizen science based practices and methods used during EIA
- to understand different comparison methods, their background and applications used during EIA
- environmental impact data gathering and management tools like gis applications and spreading models.

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

SSE21SVLTI-1018 Research Methods, Sustainability Literature and Applied Projects: 15 ECTS

AT00CK26 Research Methods and Reporting: 5 ECTS

Learning outcomes
The student is able to
- to obtain, utilize and assess R&D-related information and their sources critically,
- to follow the rules of ethical principles applied in all research activities,

- to use the most typical research and development methods of the own study field,
- to write a scientific reports and know the scientific requirements for language, style and references

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

AT00CK28 Sustainability Literature Reviews: 5 ECTS

Learning outcomes
The student is able to
- to select the most relevant literature related to the selected topics
- to write informative and clear reviews by using scientific terms and methods
- to analyze references and content of them
- to discuss about the literature and the topics with other students

SSE21SVLTI-1003 Complementary Competences: 99 ECTS

SSE21SVLTI-1015 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

SSE21SVLTI-1020 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

SSE21SVLTI-1021 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)

- 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

SSE21SVLTI-1022 Digital Tools for Circular Economy: 0 ECTS

AT00CK14 Digital Tools and Platforms: 5 ECTS

Learning outcomes
The student is able to
- how to act responsibly and secure in digital environments
- to understand the importance of digitalization in working life and especially in circular economy solutions
- to observe the importance of IoT, big data, robotics and AI as a tool in promoting circular economy and sustainability
- to use CAD and GIS in a basic level

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

SSE21SVLTI-1023 Environmental, Health, Quality and Security Management: 0 ECTS

AT00CK20 EHQS-systems, Standards and Auditing: 5 ECTS

Learning outcomes
The student is able to
- systems thinking and principles of commonly used EHQS –standards (ISO standard series, EMAS, OHSAS etc.)
- company level management systems and applications (GRI, EMAS, ISO etc.)
- how to carry out the process as a whole: set-up, management, auditing and reporting

AT00CK21 Environmental Management Tools, Certificates and Reporting: 5 ECTS

Learning outcomes
The student is able to
- know how to create measures to manage resource and environmental efficiency and CSR - development of the company
- to know commonly used environmental and sustainability certificates and labels
- to select reasonable measurement systems and tools to be used in the company
- report guidelines and standards, measures and practices

AT00CK22 Security and Risk Management: 5 ECTS

Learning outcomes
The student is able to
- to understand the signification of the risk management in different administrative and industrial sectors.
- to develop security within as a part of the own work
- to be able to identify, evaluate, quantify and monitor potential insecurity and risks
- to be able to make suggestions for avoidance and reductions,
- to know how to use management tools

SSE21SVLTI-1025 Exchange Studies: 0 ECTS

SSE21SVLTI-1004 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 int 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 int 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 int the work done in practical training

SSE21SVLTI-1005 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.