11.11.2022

Curriculum at LAB University of Applied Sciences
2021-2022

Bachelor of Engineering, Industrial Information Technology 21S, full-time studies, Lappeenranta

Code	Name	1 y	2 y	3 y	4 y	ECTS total
IIT21SLPR-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
IIT21SLPR-1002 Professional Core Competences						**135**
IIT21SLPR-1012 Transferable competences						**6**
KS00BT59	Expert Communication Skills	4				4
K200CE69	Finnish 1	3				3
K200CE70	Finnish 2	3				3
KR00BU42	Swedish for Work, Spoken	1				1
KR00BU43	Swedish for Work, Written	1				1
IIT21SLPR-1010 Basics of STEM						**15**
AT00CH47	Basic studies in mathematics	3				3
AT00CH48	Mathematics in Technology 1	3				3
AT00CH50	Basic Studies in Physics	3				3
AT00CM65	ICT's Science		6			6
IIT21SLPR-1011 Engineering studies						**114**
AT00CK32	Introduction to Industrial ICT Engineering	15				15
AT00CK33	Introduction to IoT Pipeline	15				15
AT00CK34	Embedded Systems		9			9
AT00CK35	Designing IoT Pipeline		15			15
AT00CK36	Implementing IoT Pipeline		15			15
AT00CK37	DevOps Engineering			15		15
AT00CK38	Virtualization: Networks and Security		15			15
AT00CK39	Data and RDI as a success factors			15		15
IIT21SLPR-1003 Complementary Competences						**45**
AT00CK40	Automation and Robotics			15		15
AT00CH72	Project in Company Co-Operation			15		15

AT00CK41	Software Engineering and Digital Transformation				15	15
IIT21SLPR-1006 Exchange Studies						**0**
IIT21SLPR-1007 LUT University Studies						**0**
IIT21SLPR-1008 Technology Studies						**0**
IIT21SLPR-1004 Practical Training						**30**
HA00CE82	Practical Training	5	5			10
HA00CE83	Practical Training 2		5	5		10
HA00CE84	Practical Training 3			5	5	10
IIT21SLPR-1005 Thesis						**15**
AO00CE85	Thesis Planning				5	5
AO00CE86	Thesis Research and Writing				5	5
AO00CE87	Thesis Publication				5	5

IIT21SLPR-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.

IIT21SLPR-1002 Professional Core Competences: 135 ECTS

IIT21SLPR-1012 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.

K200CE69 Finnish 1: 3 ECTS

Learning outcomes
The student is able to
- identify and use the course vocabulary and phrases for common everyday situations
- tell about oneself and understand basic questions
- read and write simple sentences related to the course topics.

Proficiency level: A1

K200CE70 Finnish 2: 3 ECTS

Learning outcomes
The student is able to
- communicate in most common everyday situations
- understand slowly and clearly spoken Finnish when the topic and the vocabulary are familiar
- understand and write a simple message or text
- use the basic vocabulary and some grammatical structures of Finnish.

Proficiency level: A1

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.

IIT21SLPR-1010 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

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

AT00CM65 ICT's Science: 6 ECTS

Learning outcomes
The student is able to
- recognize different magnitudes and quantities in ICT problems and their graphical representation.
- understand physics and mathematics in ICT phenomena.
- formulate abstract problems into a form where they can be solved and recognize possible error sources.
- understands basic electrical circuits and their quantities

IIT21SLPR-1011 Engineering studies: 114 ECTS

AT00CK32 Introduction to Industrial ICT Engineering: 15 ECTS

Learning outcomes
The student is able to
- understands the role of ICT in engineering
- describe the automation system at a general level
- describe the concepts and principles of industrial ICT
- understand the role of the data in ICT engineering

- use common digital documentation and communication tools in the work of an engineering
- understand project based team work methods and principles in engineering
- create a program using structured programming language
- understand HTML and CSS basics
- understand the basics of statistical thinking

AT00CK33 Introduction to IoT Pipeline: 15 ECTS

Learning outcomes
The student is able to
- create a program using object-oriented programming language with databases (in the cloud too)
- understand the principles of user interfaces
- understand operating systems principles
- understand the role of the cloud platform in an IoT pipeline
- explain the structure of the IoT data pipeline, the meaning of the parts of the pipeline and principles of the machine learning and artificial intelligence
- understand the requirements of sensor data in the data value chain.
- understand the basic principles of the secure data transfer from the IoT device to the IoT data pipeline

AT00CK34 Embedded Systems: 9 ECTS

Learning outcomes
The student is able to
- Recognize the main components of an embedded system and understand the system architecture
- Describe the properties of different electronics components and choose appropriate components for the application
- Design and implement embedded software in the C programming language
- Design and implement a simple embedded device

AT00CK35 Designing IoT Pipeline: 15 ECTS

Learning outcomes
The student is able to
- design and use appropriate data structures and algorithms
- create a simple GUI for IoT-system
- transfer data securely from IoT device to a cloud using platform services (programming point of view)
- use version control systems in software development
- design and evaluate ML and AI algorithms
- work as an active team member in an ICT project with modern teamwork methods and tools

AT00CK36 Implementing IoT Pipeline: 15 ECTS

Learning outcomes
The student is able to
- create a scalable restful API-services for IoT data
- implement ML and AI operations also in edge devices

- use appropriate databases to store IoT data in the platform
- work as a team leader in an ICT project and a member in a multidisciplinary project

AT00CK37 DevOps Engineering: 15 ECTS

Learning outcomes
The student is able to
- describe the roles and methods of agile software development environments
- understand software architecture importance and use std patterns
- develop front and backend services using Javascript (and Node)
- operate according to DevOps principles (CI/CD)

AT00CK38 Virtualization: Networks and Security: 15 ECTS

Learning outcomes
The student is able to
- use containers and virtualization as a programming and production platform for software systems
- design, create and manage a virtualized environment for an application project
- compare different hypervisors and cloud services to identify the strengths and weaknesses relevant to the solution
- utilize and maintain different operating systems (Linux/Windows) efficiently in a virtualized environment
- manage (private) cloud platform efficiently and securely and understand private/public cloud notable differences

AT00CK39 Data and RDI as a success factors: 15 ECTS

Learning outcomes
The student is able to
- utilize modern analyzing, ML, and AI tools to solve engineering problems
- visualize and report the processed data in a suitable way using modern tools
- create a data visualization using HTML and backend services
- understand digital twin operation principles
- understand the importance and principles of leading, law, marketing and business economy as a part of a company operations
- write a technical report and represent it

IIT21SLPR-1003 Complementary Competences: 45 ECTS

AT00CK40 Automation and Robotics: 15 ECTS

Learning outcomes
The student is able to
- understand Automation system hardware principles and control models
- implement PLC principles and programming, HMI panel and SCADA software
- utilize Distribution and communication using std industrial protocols and buses
- understands Sensors and actuators (operation principles and connection types)

- implement simple digital twins
- understands principles and programming of industrial robots as a part of an automation system

AT00CH72 Project in Company Co-Operation: 15 ECTS

Learning outcomes
Student is able to
- carry out a project in co-operation with the external customer

AT00CK41 Software Engineering and Digital Transformation: 15 ECTS

IIT21SLPR-1006 Exchange Studies: 0 ECTS

IIT21SLPR-1007 LUT University Studies: 0 ECTS

IIT21SLPR-1008 Technology Studies: 0 ECTS

IIT21SLPR-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

IIT21SLPR-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.