

**Curriculum at LAB University of Applied Sciences  
2019-2020**

**Bachelor of Engineering, Mechanical Engineering, Lahti**

Code	Name	1 y	2 y	3 y	4 y	ECTS total
<b>TEKTT19K-1000 CORE COMPETENCE</b>						<b>180</b>
<b>TEKTT19K-1001 Common Core Competence</b>						<b>25</b>
LA00BE73	English for Work	3				3
LA00BE74	Swedish language, Oral Communication	1				1
LA00BE75	Swedish language, Written Communication	2				2
LA00BE76	Professional communication	4				4
LA00BE77	Developing professional competence 1	2				2
LA00BQ87	Developing professional competence 2	1	1			2
LA00BQ88	Developing professional competence 3		0,5	0,5		1
LA00BE78	Research and Development			5		5
LA00BE79	Anticipating Future Trends			5		5
<b>TEKTT19K-1002 Professional Core Competence</b>						<b>155</b>
<b>TEKTT19K-1003 Digitalisation</b>						<b>10</b>
TE00BH08	Digitalisation of the Future	3				3
TE00BH09	Networks, Data Security and Cloud Services	3				3
TE00BH10	Digital Tools	4				4
<b>TEKTT19K-1004 Mekaniikka</b>						<b>10</b>
TE00BH11	Mathematical tools	5				5
TE00BH12	Mechanical Applications	5				5
<b>TEKTT19K-1005 Electricity, Heat and Energy</b>						<b>15</b>
TE00BH13	Electricity		6			6
TE00BH14	Heat and Energy		6			6
TE00BH15	English for Engineers		3			3
<b>TEKTT19K-1006 Mechanics and Automation 1</b>						<b>15</b>
TE00BF61	Basics of Mechanics	5				5
TE00BF62	Basics of Automation	5				5
TE00BF63	Workshop	5				5
<b>TEKTT19K-1007 Mechanics and Automation 2</b>						<b>25</b>
TE00BM77	Mechanical Parts and Design	3				3
TE00BM78	Electric Motor Drives	7				7
TE00BG56	Mechanical Parts and Design	7				7
TE00BG57	Electric Motor Drives	3				3

TE00BG58	Project 1	2,5	2,5		5
<b>TEKTT19K-1008 Mechanics and Automation 3</b>					<b>15</b>
TE00BG59	Design and Modelling		7		7
TE00BG60	Pneumatics and Hydraulics		5		5
TE00BG61	Project 2.1		3		3
<b>TEKTT19K-1009 Mechanics and Automation 4</b>					<b>15</b>
TE00BG62	Mechanisation		8		8
TE00BG63	Robotics		5		5
TE00BG64	Project 2.2		2		2
<b>TEKTT19K-1010 Industrial Engineering and Management</b>					<b>15</b>
TE00BG67	Business and Marketing			5	5
TE00BG68	Management and Quality			5	5
TE00BG69	Operations Control			5	5
<b>TEKTT19K-1019 Materiaalit ja valmistustekniikat</b>					<b>15</b>
TE00BR88	Construction materials		5		5
TE00BR89	CAM/CAE		5		5
TE00BR90	Machining, welding and sheet metal technology		5		5
<b>TEKTT19K-1011 Application softwares and IoT</b>					<b>0</b>
TE00CF99	Softwares in industrial automation				0
TE00CG00	Industrial IoT				0
TE00CG01	Automation project				0
<b>TEKTT19K-1012 Automation 1</b>					<b>15</b>
TE00BM23	Control Systems		7		7
TE00BG60	Pneumatics and Hydraulics		5		5
TE00BG61	Project 2.1		3		3
<b>TEKTT19K-1013 Automation 2</b>					<b>15</b>
TE00BM24	Automation Systems		8		8
TE00BG63	Robotics		5		5
TE00BG64	Project 2.2		2		2
<b>TEKTT19K-1014 Plastic Materials</b>					<b>15</b>
TE00BH17	Basics of Plastics Engineering		5		5
TE00BH18	Structure and Strength of Plastics		5		5
TE00BH19	Properties and Testing of Plastics		5		5
<b>TEKTT19K-1016 Practical Training</b>					<b>30</b>
LA00BO03	Practical Training		3,5	6,5	10
LA00BO04	Practical Training 2		3,5	6,5	10
LA00BO05	Practical Training 3		3,5	6,5	10
<b>TEKTT19K-1017 Thesis</b>					<b>15</b>
LA00BN99	Thesis planning			5	5
LA00BO00	Thesis research and writing			5	5

LA00BO01	Thesis publication				5	5
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**TEKTT19K-1018 COMPLEMENTARY COMPETENCE**

**60**

**TEKTT19K-1000 CORE COMPETENCE: 180 ECTS**

**TEKTT19K-1001 Common Core Competence: 25 ECTS**

**LA00BE73 English for Work: 3 ECTS**

**Learning outcomes**

The student is able to

- recognise the different sources and tools to help them improve their English skills
- gain confidence and manage in written and oral communication situations required in professional studies and in the work life
- describe their education and qualifications
- understand the terminology and concepts of their own field

**LA00BE74 Swedish language, Oral Communication: 1 ECTS**

**Learning outcomes**

The student is able to

- express and justify their opinions
- use the key terminology of their own field
- tell about their education, work experience and duties e.g. in job-seeking situations
- present a company of their own trade

**LA00BE75 Swedish language, Written Communication: 2 ECTS**

**Learning outcomes**

The student is able to

- use the key terminology of their own field
- tell about their education, work experience and duties e.g. in job-seeking situations
- write a job application
- obtain information related to their own field of studies in Swedish e.g. on the Internet
- use online dictionaries

**LA00BE76 Professional communication: 4 ECTS**

**Learning outcomes**

The student is able to

- plan and produce grammatically correct texts
- write an article or an essay that fulfils the criteria of a scientific text related to their own field of studies
- perform actively in professional group communication situations
- retrieve information from a variety of sources and evaluate it critically

## **LA00BE77 Developing professional competence 1: 2 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 Lahti UAS
- picture their own field of studies and its future skills
- give feedback on tuition and services and thus participate in the development of education

## **LA00BQ87 Developing professional competence 2: 2 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

## **LA00BQ88 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

## **LA00BE78 Research and Development: 5 ECTS**

### **Learning outcomes**

The student is able to

- obtain, utilise and assess R&D-related information and their sources critically
- follow the rules of ethical principles applied in all research activities
- use the most typical research and development methods of their own field
- write a scientific report and is familiar with the requirements for language and style and how to document the sources

## **LA00BE79 Anticipating Future Trends: 5 ECTS**

### **Learning outcomes**

The student is able to

- anticipate the changes in their own operational environment

- utilise the futures research materials produced by national and international societies in their own field of studies
- use the terminology and methods of futures research in the research and development of their own field

## **TEKTT19K-1002 Professional Core Competence: 155 ECTS**

## **TEKTT19K-1003 Digitalisation: 10 ECTS**

## **TE00BH08 Digitalisation of the Future: 3 ECTS**

### **Learning outcomes**

The student is able to

- describe the significance of digitalisation in the work life and its changes
- utilise digital data storages and social media in professional contexts
- utilise the field's new technologies, such as IoT, big data, GIS, robotics and AI

## **TE00BH09 Networks, Data Security and Cloud Services: 3 ECTS**

### **Learning outcomes**

The student is able to

- operate in digital environments in a responsible way, taking data security into account
- describe the basic structure and operation of the Internet
- describe the principles of IP addresses and sub-networking
- implement a secure data network (SOHO) and connect it to an operator network
- utilise cloud services in their own work

## **TE00BH10 Digital Tools: 4 ECTS**

### **Learning outcomes**

The student is able to

- make reports and analyses with the help of wordprocessing and spreadsheet calculation software
- make a presentation of a practical project where they utilise elements of digital media
- carry out electronic publishing

## **TEKTT19K-1004 Mekaniikka: 10 ECTS**

## **TE00BH11 Mathematical tools: 5 ECTS**

### **Learning outcomes**

The student

- has the basic mathematical skills needed in engineering
- is able to describe the mechanical phenomena behind the developments in technology
- can solve mechanical problems using mathematics

## **TE00BH12 Mechanical Applications: 5 ECTS**

### **Learning outcomes**

The student is able to

- apply mechanics in practice
- apply digitalisation in mechanical phenomena
- apply vector mathematics in mechanical phenomena

## **TEKTT19K-1005 Electricity, Heat and Energy: 15 ECTS**

## **TE00BH13 Electricity: 6 ECTS**

### **Learning outcomes**

The student is able to

- describe the electrical phenomena behind developments in technology
- solve electricity-related problems using mathematics
- apply electrical phenomena in practice
- apply digitalisation in electricity-related phenomena

## **TE00BH14 Heat and Energy: 6 ECTS**

### **Learning outcomes**

The student is able to

- describe the significance of heat behind the development of technology
- solve heat- and energy-related problems using mathematics
- apply heat phenomena in practice

## **TE00BH15 English for Engineers: 3 ECTS**

### **Learning outcomes**

The students is able to

- use the terminology of their field and understand professional texts
- discuss topics related with their field
- communicate in job application situations
- present their own project orally and in writing
- write a professional report and a thesis abstract

## **TEKTT19K-1006 Mechanics and Automation 1: 15 ECTS**

## **TE00BF61 Basics of Mechanics: 5 ECTS**

### **Learning outcomes**

The student is able to

- apply a design method in the design of a device
- model the mechanical parts of a simple device
- design the parts of the device that are under tensile or compression stress

## **TE00BF62 Basics of Automation: 5 ECTS**

### **Learning outcomes**

The student

- is able to make performance specifications and a functional diagram for a device
- is able to plan the electric control of an automated device
- is able to select sensors, electrical components and actuators suitable for the device
- has a basic knowledge of the structure of a control unit

## **TE00BF63 Workshop: 5 ECTS**

### **Learning outcomes**

The student

- is able to operate safely in the mechanical and electrical workshops
- knows the basics of machining and welding
- knows the basics of electrical engineering and electronics
- is able to carry out the practical tasks required by a project

## **TEKTT19K-1007 Mechanics and Automation 2: 25 ECTS**

## **TE00BM77 Mechanical Parts and Design: 3 ECTS**

### **Learning outcomes**

The student is able to

- select and design mechanical parts according to standards
- model the mechanical parts of a device
- design parts under bending and torsional stress
- select suitable materials and mechanical components for a device

## **TE00BM78 Electric Motor Drives: 7 ECTS**

### **Learning outcomes**

The student

- is able to design and dimension a simple electric motor drive in positioning applications
- is able to plan and implement a simple motor control cabinet
- is able to apply the mathematics of linear movement in motor drive dimensioning
- can make the basic motor connections
- can choose the components of the electric motor drive

## **TE00BG56 Mechanical Parts and Design: 7 ECTS**

### **Learning outcomes**

The student is able to

- select and design mechanical parts according to standards
- model the mechanical parts of a device
- design parts under bending and torsional stress

- select suitable materials and mechanical components for a device

### **TE00BG57 Electric Motor Drives: 3 ECTS**

#### **Learning outcomes**

The student

- is able to select and design an electric motor drive
- knows the basics of electrical and machine safety

### **TE00BG58 Project 1: 5 ECTS**

#### **Learning outcomes**

The student is able to

- act in different roles in a project
- make a project plan
- design and build a mechanical device in a team

### **TEKTT19K-1008 Mechanics and Automation 3: 15 ECTS**

### **TE00BG59 Design and Modelling: 7 ECTS**

#### **Learning outcomes**

The student is able to

- design parts that are under different types of stress
- select materials and mechanical components that are suitable for the device
- model components and assemblies in 3D

### **TE00BG60 Pneumatics and Hydraulics: 5 ECTS**

#### **Learning outcomes**

The student is able to

- design a pneumatic drive
- design a hydraulic drive

### **TE00BG61 Project 2.1: 3 ECTS**

#### **Learning outcomes**

The student is able to

- design and build a manipulator
- plan the schedule and required resources for a project

### **TEKTT19K-1009 Mechanics and Automation 4: 15 ECTS**

### **TE00BG62 Mechanisation: 8 ECTS**



### **Learning outcomes**

The student

- is able to design trusses, frames and machines
- understands the theory of 3D printing and is able to produce 3D prints
- is able to implement mechanisation units in machine automation
- is able to choose suitable tolerances and surface quality for mechanical parts

### **TE00BG63 Robotics: 5 ECTS**

#### **Learning outcomes**

The student

- understands positioning techniques
- is able to describe the use and structure of industrial robots
- is able to simulate the functioning of robots
- is able to make simple programs for robots
- is able to test programs of robots in a real environment

### **TE00BG64 Project 2.2: 2 ECTS**

#### **Learning outcomes**

The student is able to

- design and produce a device for handling parts
- allocate and plan resources for a project

### **TEKTT19K-1010 Industrial Engineering and Management: 15 ECTS**

### **TE00BG67 Business and Marketing: 5 ECTS**

#### **Learning outcomes**

The student

- is able to define and understand the customer's needs
- is able to apply and execute different kinds of marketing methods
- knows the basics of the money transactions of a company and their significance in business

### **TE00BG68 Management and Quality: 5 ECTS**

#### **Learning outcomes**

The student

- is able to evaluate different management methods and what their importance is for the whole company
- knows the basic concepts of labour legislation
- is able to evaluate factors influencing job satisfaction and motivation

### **TE00BG69 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

## **TEKTT19K-1019 Materiaalit ja valmistustekniikat: 15 ECTS**

### **TE00BR88 Construction materials: 5 ECTS**

#### **Learning outcomes**

Student is able to:

- use metals and metal alloys, aluminum, plastic and composites for making components
- modify the heat treatment and other properties of materials to suit different uses

### **TE00BR89 CAM/CAE: 5 ECTS**

#### **Learning outcomes**

Student is able to:

- model 3D surfaces
- produce tool paths for a machining centre
- make NC code from a surface model file of a machined piece
- use the program to simulate different machining methods

### **TE00BR90 Machining, welding and sheet metal technology: 5 ECTS**

#### **Learning outcomes**

The student is able to:

- use the basic methods of machining, welding and sheet metal technology
- compare how different manufacturing methods affect the quality and cost level

### **TEKTT19K-1011 Application softwares and IoT: 0 ECTS**

#### **Courses included in the study module**

Compulsory courses in the module

Introduction to Programming

Operating Systems and Hardware

Embedded Systems

### **TE00CF99 Softwares in industrial automation: 5 ECTS**

#### **Learning outcomes**

Student is able to

- plan and program control systems
- program softwares
- describe database usage and report principals
- define database sources
- plan a reporting system

## **TE00CG00 Industrial IoT: 5 ECTS**

### **Learning outcomes**

Student is able to

- define IoT structure
- describe IoT process in general
- compare IoT platforms
- define required mobile soft
- use IoT solutions in business

## **TE00CG01 Automation project: 5 ECTS**

### **Learning outcomes**

Student is able to

- create a project plan
- implement a advanced automation software
- report results

## **TEKTT19K-1012 Automation 1: 15 ECTS**

## **TE00BM23 Control Systems: 7 ECTS**

### **Learning outcomes**

The student

- knows the basics of PLC programming (logical circuits, programming methods)
- knows the structure of modular PLC and can do the hardware configuration
- can plan and implement a basic positioning program with modular PLC
- can do the wiring of PLC
- can plan and program the basic interface in modular PLC
- knows the basics of the industrial databuses

## **TE00BG60 Pneumatics and Hydraulics: 5 ECTS**

### **Learning outcomes**

The student is able to

- design a pneumatic drive
- design a hydraulic drive

## **TE00BG61 Project 2.1: 3 ECTS**

### **Learning outcomes**

The student is able to

- design and build a manipulator
- plan the schedule and required resources for a project

## **TEKTT19K-1013 Automation 2: 15 ECTS**

## **TE00BM24 Automation Systems: 8 ECTS**

### **Learning outcomes**

The student is able to

The student is able to

- use machine vision systems in product recognition
- make accurate position measurements with laser sensor technology
- read RFID-tags with PLC
- plan and implement automation system interface (PC)
- make a configuration of industrial databuses

## **TE00BG63 Robotics: 5 ECTS**

### **Learning outcomes**

The student

- understands positioning techniques
- is able to describe the use and structure of industrial robots
- is able to simulate the functioning of robots
- is able to make simple programs for robots
- is able to test programs of robots in a real environment

## **TE00BG64 Project 2.2: 2 ECTS**

### **Learning outcomes**

The student is able to

- design and produce a device for handling parts
- allocate and plan resources for a project

## **TEKTT19K-1014 Plastic Materials: 15 ECTS**

## **TE00BH17 Basics of Plastics Engineering: 5 ECTS**

### **Learning outcomes**

The student is able to

- compare plastics based on their properties
- describe how the properties of plastics are dependent on time and temperature
- select materials for different end uses

## **TE00BH18 Structure and Strength of Plastics: 5 ECTS**

### **Learning outcomes**

The student

- knows the basics of designing components made of plastics and composites
- is able to design a plastic product that is under mechanical stress
- is able to describe fracture mechanisms in plastic components under stress

- is able to design composite products
- knows the stresses, stiffening and designing of injection-moulded components
- knows the databases dealing with the strength of composites

## **TE00BH19 Properties and Testing of Plastics: 5 ECTS**

### **Learning outcomes**

The student is able to

- identify the basic testing techniques used in polymer and fibre technology
- conduct tests on the properties of different materials and to write the relevant reports on those tests
- use the machines for processing plastics and fibres and the devices used to test polymer materials

## **TEKTT19K-1016 Practical Training: 30 ECTS**

### **LA00BO03 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 in the work done in practical training

### **LA00BO04 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

### **LA00BO05 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

network

- evaluate and develop their own competence into the work done in practical training

### **TEKTT19K-1017 Thesis: 15 ECTS**

### **LA00BN99 Thesis planning: 5 ECTS**

#### **Learning outcomes**

The student is able to

- apply the acquired theoretical knowledge to the problems and phenomena of the working life
- solve problems, organise and perceive wholes
- work interactively, tenaciously and systematically
- work according to the practices of their own line of trade
- gather information and evaluate sources critically - report their work orally, in writing and visually

### **LA00BO00 Thesis research and writing: 5 ECTS**

#### **Learning outcomes**

The student is able to

- apply the acquired theoretical knowledge to the problems and phenomena of the working life
- solve problems, organise and perceive wholes
- work interactively, tenaciously and systematically
- work according to the practices of their own line of trade
- gather information and evaluate sources critically - report their work orally, in writing and visually

### **LA00BO01 Thesis publication: 5 ECTS**

#### **Learning outcomes**

The student is able to

- apply the acquired theoretical knowledge to the problems and phenomena of the working life
- solve problems, organise and perceive wholes
- work interactively, tenaciously and systematically
- work according to the practices of their own line of trade
- gather information and evaluate sources critically - report their work orally, in writing and visually

### **TEKTT19K-1018 COMPLEMENTARY COMPETENCE: 60 ECTS**

#### **Courses included in the study module**

You can find Complementary Competence courses in a separate curriculum called "Complementary Competence Courses Taught in English, Bachelor's Degree, 17S-".

In addition, you can choose Professional Core Competence courses of other Bachelor's Degree Programmes as your Complementary Competence Courses.