Curriculum at Lahti University of Applied Sciences
2018-2019

Bachelor’s Degree Programme in Mechanical Engineering 18K

Code	Name	1 y	2 y	3 y	4 y	ECTS total
TEKTT18K-1000	**CORE COMPETENCE**					**180**
TEKTT18K-1001	**Common Core Competence**					**25**
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
TEKTT18K-1002	**Professional Core Competence**					**155**
TEKTT18K-1003	**Digitalisation**					**10**
TE00BH08	Digitalisation of the Future	3				3
TE00BH09	Networks, Data Security and Cloud Services	3				3
TE00BH10	Digital Tools	4				4
TEKTT18K-1004	**Mekaniikka**					**10**
TE00BH11	Mathematical tools	5				5
TE00BH12	Mechanical Applications	5				5
TEKTT18K-1005	**Electricity, Heat and Energy**					**15**
TE00BH13	Electricity		6			6
TE00BH14	Heat and Energy		6			6
TE00BH15	English for Engineers		3			3
TEKTT18K-1006	**Mechanics and Automation 1**					**15**
TE00BF61	Basics of Mechanics	5				5
TE00BF62	Basics of Automation	5				5
TE00BF63	Workshop	5				5
TEKTT18K-1007	**Mechanics and Automation 2**					**25**
TE00BM77	Mechanical Parts and Design	1,5	1,5			3
TE00BM78	Electric Motor Drives	3,5	3,5			7
TE00BG56	Mechanical Parts and Design	3,5	3,5			7

TE00BG57	Electric Motor Drives	1,5	1,5			3
TE00BG58	Project 1	2,5	2,5			5
TEKTT18K-1008	**Mechanics and Automation 3**					**0**
TE00BG59	Design and Modelling		7			7
TE00BG60	Pneumatics and Hydraulics		5			5
TE00BG61	Project 2.1		3			3
TEKTT18K-1009	**Mechanics and Automation 4**					**0**
TE00BG62	Mechanisation			8		8
TE00BG63	Robotics			5		5
TE00BG64	Project 2.2			2		2
TEKTT18K-1010	**Industrial Engineering and Management**					**0**
TE00BG67	Business and Marketing			5		5
TE00BG68	Management and Quality			5		5
TE00BG69	Operations Control			5		5
TEKTT18K-1040	**Materiaalit ja valmistustekniikat**					**0**
TE00BR88	Construction materials		5			5
TE00BR89	CAM/CAE		5			5
TE00BR90	Machining, welding and sheet metal technology		5			5
TEKTT18K-1020	**ICT Systems**					**0**
TE00BF43	Introduction to Programming			5		5
TE00BH30	Operating Systems and Hardware			5		5
TE00BH31	Embedded Systems			5		5
TEKTT18K-1018	**Automation 1**					**0**
TE00BM23	Control Systems		7			7
TE00BG60	Pneumatics and Hydraulics		5			5
TE00BG61	Project 2.1		3			3
TEKTT18K-1019	**Automation 2**					**0**
TE00BM24	Automation Systems			8		8
TE00BG63	Robotics			5		5
TE00BG64	Project 2.2			2		2
TEKTT18K-1011	**Plastic Materials**					**0**
TE00BH17	Basics of Plastics Engineering			5		5
TE00BH18	Structure and Strength of Plastics			5		5
TE00BH19	Properties and Testing of Plastics			5		5
TEKTT18K-1013	**Practical Training**					**30**
LA00BO03	Practical Training	2,5	2,5	2,5	2,5	10
LA00BO04	Practical Training 2	2,5	2,5	2,5	2,5	10
LA00BO05	Practical Training 3	2,5	2,5	2,5	2,5	10
TEKTT18K-1014	**Thesis**					**15**
LA00BN99	Thesis planning			1,5	3,5	5

LA00BO00	Thesis research and writing			1,5	3,5	5
LA00BO01	Thesis publication			1,5	3,5	5

TEKTT18K-1015 COMPLEMENTARY COMPETENCE **60**

TEKTT18K-1000 CORE COMPETENCE: 180 ECTS

TEKTT18K-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

TEKTT18K-1002 Professional Core Competence: 155 ECTS

TEKTT18K-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 spreadheet calculation software
- make a presentation of a practical project where they utilise elements of digital media
- carry out electronic publishing

TEKTT18K-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

TEKTT18K-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

TEKTT18K-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

TEKTT18K-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 mechnical 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 dimentioning
- 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 mechnical 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

TEKTT18K-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

TEKTT18K-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

TEKTT18K-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

TEKTT18K-1040 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

TEKTT18K-1020 ICT Systems: 15 ECTS

Courses included in the study module
Compulsory courses in the module
Introduction to Programming
Operating Systems and Hardware
Embedded Systems

TE00BF43 Introduction to Programming: 5 ECTS

Learning outcomes
The student is able to
- use logical operations in programming
- describe the stages of software development and the principles of program execution
- design and implement a modular interactive application
- utilise software development tools
- give variables and functions descriptive names

- follow good programming practices.

TE00BH30 Operating Systems and Hardware: 5 ECTS

Learning outcomes
The student is able to
- describe the structures and basic operations of a computer and peripherals
- describe the basics of the maintenance of a system
- understand the significance of data security in the operation and maintenance of systems
- describe the concepts of data transfer, the principles of telecommunications and data transfer networks, and the data transfer protocols

TE00BH31 Embedded Systems: 5 ECTS

Learning outcomes
The student is able to
- understand the basics of processor architectures and differences between architectures
- explain the principles of instruction set and machine level programming
- describe the microprocessor hardware interfaces
- use hardware-oriented programming properties of a programming language
- design and implement modular software for an embedded system using a programming language
- simulate and implement embedded programs with embedded computer hardware
- describe the basic computer peripherals.

TEKTT18K-1018 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

TEKTT18K-1019 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

TEKTT18K-1011 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

TEKTT18K-1013 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 int 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 int 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
- evaluate and develop their own competence int the work done in practical training

TEKTT18K-1014 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

TEKTT18K-1015 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.