Curriculum at Lahti University of Applied Sciences
2018-2019

Bachelor of Engineering, Information and Communications Technology

Code	Name	1 y	2 y	3 y	4 y	ECTS total
TETVT18-1000	**CORE COMPETENCE**					**180**
TETVT18-1001	**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		2			2
LA00BQ88	Developing professional competence 3			1		1
LA00BE78	Research and Development			5		5
LA00BE79	Anticipating Future Trends			5		5
TETVT18-1002	**Professional Core Competence**					**155**
TETVT18-1003	**Digitalisation**					**10**
TE00BH08	Digitalisation of the Future	3				3
TE00BH09	Networks, Data Security and Cloud Services	3				3
TE00BH10	Digital Tools	4				4
TETVT18-1004	**Mechanics**					**10**
TE00BH11	Mathematical tools	5				5
TE00BH12	Mechanical Applications	5				5
TETVT18-1005	**Electricity, Heat and Energy**					**15**
TE00BH13	Electricity		6			6
TE00BH14	Heat and Energy		6			6
TE00BH15	English for Engineers		3			3
TETVT18-1006	**Internet of Things**					**15**
TE00BH26	WWW Technologies	5				5
TE00BH27	Networking Fundamentals	5				5
TE00BH28	IoT Project	5				5
TETVT18-1007	**ICT Systems**					**15**
TE00BF43	Introduction to Programming	5				5
TE00BH30	Operating Systems and Hardware	5				5
TE00BH31	Embedded Systems	5				5

TE00BH32	Media Systems	5				5
TETVT18-1008	**Applications**					**15**
TE00BH33	Object-oriented Programming Essentials		4			4
TE00BN77	Tietovarastot		4			4
TE00BH34	Game Programming Essentials		4			4
TE00BH35	Applications Project		3			3
TETVT18-1009	**Platforms and Languages**					**0**
TE00BH36	Programming Languages		5			5
TE00BH37	Distributed Systems		5			5
TE00BH38	Platform Computing		5			5
TETVT18-1010	**Software Engineering**					**0**
TE00BH41	Software Engineering			4		4
TE00BH42	Software Architectures			4		4
TE00BH43	Software Testing and Maintenance			4		4
TE00BH44	User Experience			3		3
TETVT18-1011	**Networks and Security**					**0**
TE00BH45	Routing and Switching Essentials		5			5
TE00BH46	Network Security and Wireless Technologies		5			5
TE00BH47	Network and Security Workshop		5			5
TETVT18-1012	**Servers and Services**					**0**
TE00BH48	Data Centers and Network Management			5		5
TE00BH49	Advanced Network Technologies			5		5
TE00BH50	Data Transfer in IoT			5		5
TETVT18-1013	**Technical Visualisation**					**0**
TE00BN76	Image processing		3			3
TE00BH52	3D Modelling		5			5
TE00BH53	Composition and Colour Theory		3			3
TE00BH54	CAD		4			4
TETVT18-1014	**Digital Animation**					**0**
TE00BH55	Animation			5		5
TE00BH56	Multimedia			5		5
TE00BH57	3D Modelling 2			5		5
TETVT18-1015	**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
TETVT18-1016	**Thesis**					**15**
LA00BN99	Thesis planning			2,5	2,5	5
LA00BO00	Thesis research and writing			2,5	2,5	5
LA00BO01	Thesis publication			2,5	2,5	5

TETVT18-1017 COMPLEMENTARY COMPETENCE 60

TETVT18-1000 CORE COMPETENCE: 180 ECTS

TETVT18-1001 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

TETVT18-1002 Professional Core Competence: 155 ECTS

TETVT18-1003 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

TETVT18-1004 Mechanics: 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

TETVT18-1005 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

TETVT18-1006 Internet of Things: 15 ECTS

TE00BH26 WWW Technologies: 5 ECTS

Learning outcomes
The student is able to
- use the web-based services of Lahti UAS
- describe the basic operation of the Internet and the main Internet protocols
- design and implement a website using the HTML language and CSS style specifications
- take the principles of accessibility and usability into account when implementing websites
- implement the visual appearance of a website on the basis of a layout diagram

- use the basic structures of programming in the implementation of websites
- utilise simple scripts on websites.

TE00BH27 Networking Fundamentals: 5 ECTS

Learning outcomes
The student is able to
- understand the principles of the OSI model and the TCP/IP model
- know TCP/IP protocols and understands their operation
- understand subnets and basics of routing and switching.

TE00BH28 IoT Project: 5 ECTS

Learning outcomes
The student is able to
- document different stages of a project using wordprocessing, spreadsheet calculation and presentation material software
- work in a team that designs and implements a solution that meets the requirements of the given project assignment
- work independently and as a member of a team, in order to carry out a project assignment
- follow the practices of project work
- know how to acquire and utilise information for a project
- evaluate the significance of the use of ICT in sustainable development, from the ecological point of view
- connect a sensor to a digital device and analyse the data it provides

TETVT18-1007 ICT Systems: 15 ECTS

Courses included in the study module
Compulsory courses in the module
Introduction to Programming
Operating Systems and Hardware
On of the following courses
Embedded Systems
Media 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.

TE00BH32 Media Systems: 5 ECTS

Learning outcomes
The student is able to
- understand capabilities and restrictions of video streaming
- describe the protocols which are used for streaming live video
- set up a streaming server in a virtual server environment
- edit a short video film
- describe the most important video encoding methods and their advantages
- publish good quality videos in the Internet
- describe different roles in a video production team
- use basic functionalities of video cameras
- use video editing and post processing software on a basic level

TETVT18-1008 Applications: 15 ECTS

TE00BH33 Object-oriented Programming Essentials: 4 ECTS

Learning outcomes
The student is able to
- understand the basic concepts of the object paradigm and object-oriented programming
- design and implement applications with an object-oriented language
- operate efficiently in a modern software development environment
- organise an application structure to be maintained

TE00BN77 : 4 ECTS

TE00BH34 Game Programming Essentials: 4 ECTS

Learning outcomes
The student is able to
- understand the principles and work flow of game programming
- master basic techniques to create interactive models
- know how to use physics engines
- create a simple game
- manipulate game objects by scripting.

TE00BH35 Applications Project: 3 ECTS

Learning outcomes
The student is able to
- acquire information and apply it in order to carry out an application project assignment
- analyse a customer's problems and make a project plan based on the analysis
- design and implement a software project utilising data storages
- utilise the features of a software development environment when implementing a project
- work both independently and as an active member of a team in order to meet the objectives set for the project
- work alone and as a member of a project team according to the goals of the project
- see a project from the point of view of the project manager and the steering group.

TETVT18-1009 Platforms and Languages: 15 ECTS

TE00BH36 Programming Languages: 5 ECTS

Learning outcomes
The student is able to
- make a program using different object-oriented languages
- use libraries, e.g. containers, efficiently while programming
- use object-oriented programs to solve problems
- make an efficient and well-structured object-oriented program.

TE00BH37 Distributed Systems: 5 ECTS

Learning outcomes
The student is able to
- understand communication technologies between computers from the programmer's point of view
- design and implement distributed programs in a network environment
- implement the design and implementation principles of distributed programs
- use middleware services in distributed software development.

TE00BH38 Platform Computing: 5 ECTS

Learning outcomes
The student is able to
- design and implement programs in different programming platforms
- use platform services to implement concurrency and persistency in programs
- use platform services to implement communication and synchronization between processes
- implement GUI using platform services and tools
- knows the design principles of device driver programming.

TETVT18-1010 Software Engineering: 15 ECTS

TE00BH41 Software Engineering: 4 ECTS

Learning outcomes
The student is able to
- describe the processes of software development
- describe the lifecycle of software products
- use UML to design, analyze and describe software products
- make software requirements and specification documents
- know the tools and principles of the software development process.

TE00BH42 Software Architectures: 4 ECTS

Learning outcomes
The student is able to
- understand the importance of software architecture in software analysis, design, development and maintenance
- document software architectures
- know the most widely used software design patterns, architectural styles and idioms
- implement software architecture using an object-oriented programming language.

TE00BH43 Software Testing and Maintenance: 4 ECTS

Learning outcomes
The student is able to
- describe the concepts, terminology and principles of software testing
- design a test plan, implement tests according to the plan and produce a test report
- use modern IDE tools to generate unit tests systematically and automatically
- use software maintenance tools and methods
- create software libraries and installer packages for software products

TE00BH44 User Experience: 3 ECTS

Learning outcomes
The student is able to
- know the design principles of user interfaces with high usability
- design, test and analyze the UI
- understand the importance of responsive UI design

- act according the process of usability engineering
- know the laws of aesthetics in user interface design.

TETVT18-1011 Networks and Security: 15 ECTS

TE00BH45 Routing and Switching Essentials: 5 ECTS

Learning outcomes
The student is able to
- configure the basic configuration of routers and interpret diagrams of network topologies
- use the IOS user interface and its commands
- to do subnetting
- describe the basic principles of routing and knows routing protocols (EIGRP, RIP, OSPF)
- test IP connections and describe the basic principles of troubleshooting.

TE00BH46 Network Security and Wireless Technologies: 5 ECTS

Learning outcomes
The student is able to
- describe the most important concepts, standards of wireless networks and information security
- use different user authentication and cryptology technologies
- increase home network security in wired and wireless environments
- describe the characteristics of radio signals and the architectures of radio networks
- plan and implement a secure wireless network.

TE00BH47 Network and Security Workshop: 5 ECTS

Learning outcomes
The student is able to
- acquire information and knowledge independently and use it to solve problems in a project
- define a problem and is able to find and compare appropriate solutions
- plan and implement a solution which fulfills the requirements of the project
- act independently and as a part of a team to achieve project objectives

TETVT18-1012 Servers and Services: 15 ECTS

TE00BH48 Data Centers and Network Management: 5 ECTS

Learning outcomes
The student is able to
- describe basics of network management systems
- use the deployment of network management systems
- describe different application deployment scenarios and their cost models and license limitations

TE00BH49 Advanced Network Technologies: 5 ECTS

Learning outcomes
The student is able to
- describe basics of backbone technologies and services
- plan and implement a backbone network by using related protocols
- plan and implement advanced services to a backbone network.

TE00BH50 Data Transfer in IoT: 5 ECTS

Learning outcomes
The student is able to
- describe the basics of data transfer in wireless and wired communication channels.
- describe different modulation and coding methods
- use communication protocols that are used in IoT applications
- describe the data transfer chain from an IoT device to cloud

TETVT18-1013 Technical Visualisation: 15 ECTS

TE00BN76 Image processing: 3 ECTS

Learning outcomes
The student is able to
- use advanced techniques to merge photos
- use various techniques to create textures for 3D models
- use matte painting techniques
- exploit HDR and RAW images

TE00BH52 3D Modelling: 5 ECTS

Learning outcomes
The student is able to
- describe the basic techniques of 3D modelling
- create and modify 3D models and primitives
- create 3D objects from 2D objects
- use and modify UVW mapping settings
- use and create different kinds of materials
- use lights and cameras
- use the render command and master the options of rendering.

TE00BH53 Composition and Colour Theory: 3 ECTS

Learning outcomes
The student is able to
- describe the basics of picture composition
- describe the meaning of composition in graphics, photography and illustrations
- use the basics of the colour theory in digital production
- understand the roles of composition and colour as a part of storytelling and expression.

TE00BH54 CAD: 4 ECTS

Learning outcomes
The student is able to
- describe the role of CAD software in the production of digital design material
- use the AutoCad and SolidWorks CAD software on a basic level
- solve the problems in data exchange between different CAD and modeling software
- make rendered still images and animations of technical 3D models.

TETVT18-1014 Digital Animation: 15 ECTS

TE00BH55 Animation: 5 ECTS

Learning outcomes
The student is able to
- describe the workflow of a 3D animation project
- use keyframe editing tools and keyframe animation in 3ds Max
- use animation rendering techniques
- work with controllers and constraints.

TE00BH56 Multimedia: 5 ECTS

Learning outcomes
The student is able to
- use the basics of multimedia production
- understand the basis and objectives of content production in multimedia
- produce and edit digital material
- design a user interface and compose a multimedia product from given material.

TE00BH57 3D Modelling 2: 5 ECTS

Learning outcomes
The student is able to
- do polygon modeling
- use viewport canvas
- use special materials
- use advanced UV tools
- create low poly models
- use hair and fur features
- use iRay renderer and materials
- use render to texture

TETVT18-1015 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

TETVT18-1016 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

TETVT18-1017 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.