

Curriculum at Lahti University of Applied Sciences  
2017-2018

## Bachelor's Degree Programme in Information and Communications Technology 17S

Code	Name	1 y	2 y	3 y	4 y	ECTS total
<b>TETVT17-1000 CORE COMPETENCE</b>						<b>180</b>
<b>TETVT17-1002 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		2			2
LA00BQ88	Developing professional competence 3			1		1
LA00BE78	Research and Development			5		5
LA00BE79	Anticipating Future Trends			5		5
<b>TETVT17-1003 Professional Core Competence</b>						<b>155</b>
<b>TETVT17-1006 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>TETVT17-1028 Mechanics</b>						<b>10</b>
TE00BH11	Mathematical tools	5				5
TE00BH12	Mechanical Applications	5				5
<b>TETVT17-1029 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>TETVT17-1009 Internet of Things</b>						<b>15</b>
TE00BH26	WWW Technologies	5				5
TE00BH27	Networking Fundamentals	5				5
TE00BH28	IoT Project	5				5
<b>TETVT17-1010 ICT Systems</b>						<b>20</b>
TE00BF43	Introduction to Programming	5				5
TE00BH30	Operating Systems and Hardware	5				5
TE00BH31	Embedded Systems	5				5

TE00BH32	Media Systems	5				5
<b>TETVT17-1011 Applications</b>						<b>15</b>
TE00BH33	Object-oriented Programming Essentials		4			4
TE00BN77	Tietovarastot		4			4
TE00BH34	Game Programming Essentials		4			4
TE00BH35	Applications Project		3			3
<b>TETVT17-1012 Platforms and Languages</b>						<b>0</b>
TE00BH36	Programming Languages		5			5
TE00BH37	Distributed Systems		5			5
TE00BH38	Platform Computing		5			5
<b>TETVT17-1013 Software Engineering</b>						<b>0</b>
TE00BH41	Software Engineering			4		4
TE00BH42	Software Architectures			4		4
TE00BH43	Software Testing and Maintenance			4		4
TE00BH44	User Experience			3		3
<b>TETVT17-1014 Networks and Security</b>						<b>0</b>
TE00BH45	Routing and Switching Essentials		5			5
TE00BH46	Network Security and Wireless Technologies		5			5
TE00BH47	Network and Security Workshop		5			5
<b>TETVT17-1015 Servers and Services</b>						<b>0</b>
TE00BH48	Data Centers and Network Management			5		5
TE00BH49	Advanced Network Technologies			5		5
TE00BH50	Data Transfer in IoT			5		5
<b>TETVT17-1016 Technical Visualisation</b>						<b>0</b>
TE00BN76	Image processing		3			3
TE00BH52	3D Modelling		5			5
TE00BH53	Composition and Colour Theory		3			3
TE00BH54	CAD		4			4
<b>TETVT17-1017 Digital Animation</b>						<b>0</b>
TE00BH55	Animation			5		5
TE00BH56	Multimedia			5		5
TE00BH57	3D Modelling 2			5		5
<b>TETVT17-1004 Practical Training</b>						<b>30</b>
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
<b>TETVT17-1005 Thesis</b>						<b>15</b>
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

**TETVT17-1000 CORE COMPETENCE: 180 ECTS**

**TETVT17-1002 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

## **TETVT17-1003 Professional Core Competence: 155 ECTS**

## **TETVT17-1006 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

## **TETVT17-1028 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

**TETVT17-1029 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

**TETVT17-1009 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

## **TETVT17-1010 ICT Systems: 20 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

## **TETVT17-1011 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.

## **TETVT17-1012 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.

## **TETVT17-1013 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.

## **TETVT17-1014 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

## **TETVT17-1015 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

## **TETVT17-1016 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.

## **TETVT17-1017 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

## **TETVT17-1004 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 into 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 into 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 into the work done in practical training

### **TETVT17-1005 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

**TETVT17-1001 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.