

Autumn 2026

Component code	Component Title	ECTS
IT00AS78	Tools of software development	2
IT00AS6	Fundamentals of programming	5
IT00AL13	ICT entrepreneurship	3
IT00AK57	Cloud foundations and operations	5
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YY00AN29	Basics of Finnish 1	3

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Component code	Component Title	ECTS
IT00AK60	Applied artificial intelligence	6
IT00AL54	Internet of things (online)	4
TL00AK71	Functions	3
IT00AL04	Relational databases and SQL	5
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Component code	Component Title	ECTS
IT00AS78	Tools of software development	2
<p>Goal: The student is able to use: Version control tools, Command line tool, Editors, Project management tools, Communication tools, Documentation tools.</p> <p>Content: Version control GitHub & Git; Command line tools such as Bash, Command Prompt (Windows), Terminal (Mac); Code editors such as Visual Studio Code, Visual Studio; Project management tools such as Trello; Collaboration applications such as Teams, Zoom, Slack; Drawing tools such as Draw.IO</p>		
IT00AS6	Fundamentals of programming	5
<p>Goal: After completing the course a student:</p> <ul style="list-style-type: none"> - knows the terms variable, conditional or if, and while-loop and can use them in the programs - knows the logical operators, such as and, or and not and can use them in conditionals and while-loops. - knows what methods, method parameters and method return mean, how to create them and what happens in the program while a method is used. - can comment own code and understand how naming variables affects the readability of code. - can write simple programs which read user input, use outputs and do basic calculations. - understands the basics of lists and can use them in programs - understands the terms file and filesystem and can read a simple file with your program. - knows the basics for object oriented programming and how to use it when programming. - knows the different data types and how they differ from each other. - can overload methods and constructors. - can separate user interface from program logic. <p>Content: Printing and reading; Variables; Calculations; Conditional and comparison; Repetition and loops; Functions: Lists: Arrays: Strings: Introduction to object orientated programming</p>		
IT00AL13	ICT entrepreneurship	3
<p>The student forms a holistic understanding of entrepreneurship and its importance in society, especially regarding ICT-industry. He becomes acquainted with the company's operating conditions, operating environments, and future prospects. The student is familiar with the special features of entrepreneurship in the ICT industry. The student can set up a company around his or her own ICT skills.</p>		
IT00AK57	Cloud foundations and operations	5
<p>Student knows foundations of cloud computing, their architectures, services, and possibilities. Students is familiar with cloud services, security, architecture, pricing, and support Student has a strong understanding of cloud infrastructure Student know how run and troubleshoot cloud services Students obtains entry-level skills of DevOps (support and cloud operations roles)</p>		
IT00AK64	Intelligent devices	6
<p>The student is able to explain:</p> <ul style="list-style-type: none"> -Basics of robotics. -The definition of smart devices. -Smart device applications. <p>The student is able to conceive and design an intelligent system:</p> <ul style="list-style-type: none"> -Costs -Workload estimates -Standard -Features -Implementation plan <p>The student is able to implement the designed intelligent system:</p> <ul style="list-style-type: none"> -Required components. 		

<p>-Required software and tools. -Programming. -Testing.</p>		
IT00AL54	Internet of things	4
<p>Use-cases of Internet of things IoT –applications and different phases: -Data collection -Data transfer -Data processing and management IoT value chain Implementation of IoT application</p> <p>Previous knowledge Student knows fundamentals of programming Student is familiar with electronics and electrical components</p>		
IT00AL11	Basics of web development	5
<p>The student can use HTML to create high-quality and technically sustainable web pages. The student can add content to their web pages: images, animations, videos and audio files, and understands Creative Commons policy and content-related copyrights The student can create other basic contents The student understands the basics of publishing a site. The student can use CSS stylesheets to design web pages.</p>		
TL00AL20	Differential Calculus	3
<p>Goal: The student is familiar with the definition of derivative by using the limit of a difference quotient. The student is able to derive elementary function and composite functions. The student knows derivatives as rates of change. The student is able to determine maxima and minima for a function. The student is able to use extremum values in optimization problems. The student is familiar with differentials and is able to use differentials to calculate errors. Content: Definition of derivatives using the limit of the difference quotient, Derivatives of elementary and composite functions, Derivative as rates of change, Examining the shape of the function using first and second derivatives, Extremum values in optimization problems, Differential and error approximation</p>		
IT00AI33	Algorithms and data structures	5
<p>Goal: After completing the course student: understands the basics of algorithms and data structures and understands their meaning in software engineering; can design and implement algorithms that solve problems; understands time complexity and the Big O notation; understands recursion and can use it in problem solving; knows different sorting algorithms and their differences; knows of the list and tree data structures, especially binary search tree; understands the basics of graph data structures and searching them with DFS and BFS; knows Bellman-Ford, Dijkstra's and Floyd-Warshall algorithms and understand their basic functionality; is familiar with other common / popular algorithms Content: Algorithms and their performance; Different data structures; Recursion; Lists, stacks, queues, trees, binary trees, graphs; Search and sort methods; Popular / common algorithms</p>		
IT00AL02	Fundamentals of electronics	3
<p>The student knows the graphic symbols and function of fundamental components in electronics and also the typical function of transistors and operational amplifiers and is also able to make the necessary measurement calculations.</p>		

Diodes and their applications, bipolar and channel transistors, thyristor components, basics of power electronics, optocomponents, transistor amplifiers, operational amplifiers, power supplies, A/D and D/A converters, computer aided simulation of electronic circuits.		
IT00AN01	Fundamentals of Python programming	3
<p>Introduction to Python Python tools Basics in programming using Python -variables, datatypes, operators, branching, looping, arrays, functions Basics of OOP with Python -class, object, data members, operations, access specifiers -relationships between objects: association, aggregation, composition, inheritance Gui and Python -Tkinter, components, layout, event handling</p> <p>Student knows how to use chosen Python tool Student can create basic level Python programs. Student can create GUI based Python programs. Student can create OOP programs with Python. Student can understand the meaning of exceptions. Student can use files in Python programs. Student understands basics of testing.</p>		
IT00AL09	Software engineering	4
<p>Goal: The student identifies different types of software: Customized, Packaged, Services. The student identifies the main roles and their areas of responsibility: Customer, Software developer, Project manager. The student knows the main stages of the software development process (life cycle model): Start, Design, Implementation, Testing, Deployment, Maintenance. Student knows agile development framework. Content: Software development, Agile development, Programming languages, Design, Roles.</p>		
TL00AL35	Electromagnetism	3
<p>Goal: The student recognizes basic phenomena related to electricity and magnetism, and is familiar with both old and new important technical applications. The student is able to solve simple problems related to electromagnetism, for example related to measurements and sensor technology. Content: Electrostatics, DC circuits, magnetic fields and magnetic forces, electromagnetic induction and its applications, semiconductors</p>		
IT00AX34	Data communications	3
<p>Goal: After completing the course, the student will have a foundational understanding of data transmission, communication networks, and their operating principles. The student can apply the theoretical basis of data communication to acquire new knowledge and to compare available network services. The student is able to select suitable data transmission services and technical solutions for different use cases. The student can analyse and resolve common issues related to IP configuration. Content: Basic concepts of telecommunications, data transmission technologies, telephony systems, and computer networks. Structure of IP networks and TCP/IP protocols. Examples of practical data transmission solutions.</p>		

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IT00AK60	Applied artificial intelligence	6
<p>Introduces students to the concepts and terminology of artificial intelligence (AI) and machine learning (ML). Students learn to select and apply AI/ML services to resolve business problems. Learn the stages of AI/ML development Analyze technical and operational requirements to build AI models</p>		
IT00AL54	Internet of things	4
<p>Use-cases of Internet of things IoT –applications and different phases: -Data collection -Data transfer -Data processing and management IoT value chain Implementation of IoT application</p> <p>Previous knowledge Student knows fundamentals of programming Student is familiar with electronics and electrical components</p>		
TL00AK71	Functions	3
<p>Goal: The student can recognize graphs of elementary functions. The student is able to solve equations and inequalities that include the elementary function. Student is able to solve polynomial equations among complex numbers. The student is able to use the different presentation formats of complex numbers and is able to use a suitable format for the given problem. Content: Definition of function. Determination of the roots of polynomial functions. Solving equations and inequalities that contain elementary functions (polynomial, exponential, power, logarithmic, and trigonometry). The concept of the composite function. Complex numbers. Interpretations of complex numbers.</p>		
IT00AL04	Relational databases and SQL	5
<p>Goal: After completing the course student: Understands the relational data model and can use SQL-language for querying and maintaining the data in relational databases; Can evaluate SQL possibilities to meet different information needs; Can analyse and model information needed by an organization together with relevant stakeholders; Can produce a relational database design from a previously made model; Can use the data integrity protection functionality provided by the relational database products Content: Introduction; Relational data model and basic concepts; SQL-Part; SELECT-statement; queries from one table, setting conditions for result set; aggregates and grouping; joins; hierarchical queries (demonstration); window functions (demonstration); Views: creation and use; Data maintenance: insert-, update-, delete-statements; Database structure creation and modification; Other: Database data visualization (BI Demonstration); Information modelling and database design part; analyse and model the information needed to support operations; database design and implementation based on a previously done model; protecting data integrity: normal modes, keys, referential integrity, other constraints, transactions and triggers; database design exercises</p>		
TL00AL31	Thermodynamics	2
<p>Goal: The student recognizes heat-related phenomena and can solve basic problems in connection to those. The student can apply acquired skills in practical problems. Content: Heat and measuring heat, thermal expansion, quantity of heat, conduction of heat, the laws of thermodynamics, ideal gases, heat engines, refrigerators.</p>		
IT00AL05	User interfaces and user experience	4

Goal: Student knows different prototypes (paper, digital, low-fidelity, high-fidelity); Students can design user interfaces on paper and in digital tools; Students can apply best practices for UI/UX; Students know basics elements of UI (buttons, fonts, pictures); Students can design usable user experience
Content: User interfaces and their building blocks; Colors, Images, fonts, icons; Different UI layout types (mobile, web, etc...); Key elements of user experience, different user interactions; Prototyping with paper and digital tools

IT00AL02	Fundamentals of electronics	3
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The student knows the graphic symbols and function of fundamental components in electronics and also the typical function of transistors and operational amplifiers and is also able to make the necessary measurement calculations.

Diodes and their applications, bipolar and channel transistors, thyristor components, basics of power electronics, optocomponents, transistor amplifiers, operational amplifiers, power supplies, A/D and D/A converters, computer aided simulation of electronic circuits.

IT00AL12	Advanced web development	5
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Goal: The student can use Javascript programming language to create interactive applications to Web pages. The student understands basic Javascript libraries and can use them. The student can use React, Node.js, Rest and Web API.
Content: JavaScript, React, Node.js, REST, Web Api, Other web-development frameworks.
Prerequisites: The student knows basics of programming. The student knows basics of web development (HTML+CSS).

IT00AL53	Digital techniques	3
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Goal: The student knows the typical components used in digital technology and is able to analyse and design digital logics and other basic circuits used in digital technology.
Content: Number systems, Boolean algebra, gate circuits, combination logic, commercial microcircuits and circuit families, sequential circuits, accumulators and shift registers, memory circuits, graphic symbols and design examples.

TL00AL24	Statistics	3
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Goal: The student knows the concepts of statistical research, identifies different measurement scales and is able to calculate the mean and variance of the data. The student is able to present research results with the help of tables and diagrams. The student is able to make a linear regression on the basis of the measured data and is able to study the dependence of statistical variables using a correlation coefficient. The student knows the basics of probability calculus, is able to form a point function of a discrete distribution and a density function of a continuous distribution and is able to determine their cumulative distribution functions. The student is able to determine the expected values and variances of distributions. The student recognizes the normal distribution and is able to use the normal distribution in practical examples. The student is able to determine confidence intervals and is able to form hypotheses and test them.
Content: Concepts of statistical research, measurement scales, statistics, hypotheses, linear regression, basics of probability, discrete and continuous distribution, normal distribution, confidence intervals.

IT00AK38	Software testing	3
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After completing the course, the student:
- knows the most common software testing methods and work steps.
- knows how testing is related to the phases of software development
- can carry out test-driven development, unit testing and use automated testing tools

Content: Testing methods, phases and documentation
Testing as part of software development process

Levels of testing Testing tools		
YY00AP15	Getting Local and Global	3
<p>The learning outcomes of the course</p> <p>The students have attitudes, skills and knowledge needed for efficient intercultural adaptation. The students strengthen their cultural and cosmopolitan identity with the help of social interaction and self-reflection.</p> <p>The student</p> <ul style="list-style-type: none"> - can interact in intercultural situations - understands differences between cultures and is able to accept unambiguity and new situations - is aware of his/her attitudes and skills of intercultural communication and is able to develop them - understands the local/host culture and area better <p>The target level of the course according to the Common European Framework of Reference for Languages (CEFR) is B2.</p>		