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University of Applied Sciences

Information Technology

Autumn 2022

Component code	Component Title	ECTS

TL1029	**Differential Calculus**	3
After the course students should know how to apply differential calculus methods in professional studies. The main topics are limit values, continuity, derivatives of the elementary functions, the inverse functions and implicit functions, extreme values, course of the curve, mean value theorem, differential calculus, estimation of error and application of dynamics and kinematics.		

IM00AD59	**Statistics**	3
After the course a student knows how to describe data by using statistics and how to calculate statistical parameters and key figures. The main topics are describing data by calculating numerical measures and drawing graphs, basic knowledge of probability, inferential statistics, analysing relationships and quality control.		

TL1115	**English for Working Life**	3
Vocabulary of the professional field. Basics of business letters (inquiry, quotation, order, complaint). Meetings. Presentation of a technical system to a small audience.		

TL1033	**Electrophysics**	3
After the course a student should know the fundamental laws of electromagnetic theory and with the significance of these laws the student can solve technical applications of electromagnetism. The content of the course is: Introduction to the laws of Coulomb, Gauss, Schuster, Ohm and Kirchhoff, Joule, Lorentz, Biot-Savart, Ampere-Laplace, Ampere, Faraday and Lenz. These laws govern electrostatics, direct current electric circuits, magnetic fields, electromagnetic induction with its important practical applications, and alternating current electric circuits.		

ITK1024	**Project Management**	3
The outcome of the course is a student knows the process of project management and its different phases based on demanding problem fields of multidisciplinary projects. The content of the course is choosing and organizing a project, project planning and division, maintenance of schedules, concluding the project, using a computer in project management, examples and independent computer exercises.		

ITK1040	**C Programming Language**	4
The outcome of the course is a student understands role and importance of programming languages in software development process; is able to use for own purposes Visual Studio 2015 for		

programming in C language; understands the structure of the source code of a program; is able to apply pre-processing directives in programs which are being developed; knows how to perform input / output operations; understands how to allocate memory; understands the role of data types as well as how to apply in programs primitive, compound and structured data types; understands C language operators and expressions; understands the flow control of a program; knows how to design and use in a program functions. The content of the course is Introduction; Program building blocks; Flow control; Pointers and functions; Compound data types; Input output.

ITK1028	**Electric Circuits**	3
After completing the course, a student knows the fundamental variables, measuring units and laws of electric circuits and also the basic functions of electrical circuits. The student can solve of electro technical problems. The content of the course is: Direct current circuits, components, markings, basic laws. Alternate current circuits, indicator calculus and power concepts. Calculation methods of electrical circuits. Safety Regulations.		

ITK1045	**Algorithms and Data Structures**	3
The objective is to provide students with an understanding data structures, their applications and also develop algorithmic thinking. The content of the course is Producing of algorithms and their performance; Lists, stacks, queues, trees, binary trees, graphs, applications; Search and sort methods.		

ITK1050	**Object-Oriented Modeling**	3
Integral set of two courses together with Object-Oriented Programming. It is impossible to take these courses separately. The outcome of the set of courses is a student is able to create the UML model of a real-world problem and based i but develop software using object-oriented programming paradigm. Should also know how to deal with the complexity of a problem and select appropriate types of model and design patterns in order to make the application more robust.		

ITK1034	**Relational Databases & SQL**	4
The objective of the course is a student knows the role of a database in an information system, SQL-language and also database design skills. The course answers such questions as: What is a database? The fundamentals of relational databases. SQL language and its use. Fundamentals of database design. Case-examples.		

TL1025	**Conducting research and reporting**	3
After the course students should understand thesis work/final projects as a process. Students will be able to access data sources and be able to write a well-structured and linguistically articulate research report. The content of the course is the use of data sources, research report structure and form, use of language, reviewing final projects and maturity test.		

ITK1012	**Chemistry**	3
After completing the course, a student knows basic knowledge in chemistry and the role of chemistry in environmental protection, industrial production, and in health and safety. The content of the course is: Basic principles in chemistry, structure of atoms and materials, chemical bonds, ideal gas law, acids and bases, material chemistry, basic organic chemistry and hazardous chemicals and waste management.		

TL1038	**Professionally Speaking**	3
The student can communicate efficiently and fairly fluently in various communication situations and roles in professional life. The student can give a short presentation on a professional topic. Minor inaccuracies and grammatical shortcomings do not compromise understanding. The student is aware of different cultural backgrounds and their influence on communication.		

TL1041	**Industrial Economics**	5
After the course a student should know the fundaments of industrial operations, central concepts, methods and modes of working within a company. The main topics are business economics, the characteristics of company analysis, expense concepts, contribution margin calculation, product-specific expense calculus, budgeting and investment calculations.		

ITK1035	**Operating Systems**	4
The outcome of the course is a student understands the basic concept of the architecture of computer system including processor, memory and input/output elements; is aware of important characteristics of modern operating systems e.g. Windows, Linux etc.; understands the objectives and functions of an operating system; understands concepts of instruction cycle, instruction execution, procedure calls and interrupts; understands the role of processes in an operating and their description in the operating systems; knows how to create and control processes of an operating system programmatically; understands the thread-based architecture of processes; knows how to create, control and terminate threads; understands principles and methods of sharing resources as well as processes and threads concurrency. The content of the course is computer system overview; operating system overview; processes description and control; thread description and control; exclusion and synchronization.		

ITK1042	**Communication Technology**	3
After completing the course, a student knows the basic data transfer and to gain an insight into the oppostunities that data transfer offers and has the ability to make justified selections between tha available data transfer options. The main topics are: Basics of data transfer networks. Communication networks. Telecommunication and added value services. Examples of data solutions.		

ITK1057	**Mobile Networks**	4
After completing the course, a student knows the structure and operation of different wireless networks and is able to do proper selections between different available wireless communication technologies and commercial products. The course presents the main challenges in mobile networks and the ways they are resolved		

IT00AE38	**Electronics & electric components**	4
After completing the course, a 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. The content of the course is: 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.		

ITK1036	**Information Technology Seminars**	3
After the course student should know how to acquire, utilize and present information related to specialization studies. Seminars in annually varying topics in software engineering, communications technology and IT infrastructure area.		

ITK1051	**Software Business**	3
After completing the course, a student knows how software business works and what is so special and significant for the software business. Student is familiar with trends and business models in ICT.		

TIK1094	**CCNA: Security**	5
After completing the course, a student is able to design and implement electronic data security in a local area network. The content of the course: The basics of enterprise security, hardware, software and network security. Technological security solutions such as router, firewall, VPN, NAT and IDS.		

ITK1058	**Mobile Software Development II**	5
After the course, a student should understand and know advance techniques of UX design; understand and know how to designs an application using threads; know how to handle persistent data; know how to apply telephony activities to own application; understand the concept of 2D graphics rendering; be able to design simple game. The content of the course is: Advanced techniques in UX design; Threads; Persistent data; Telephony; 2D Graphics. Prerequisits to take the course are: Software Development For Mobile Devices I; Java Programming Language; Object-oriented Programming; Software Engineering.		

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ITK1031	**Digital Techniques**	6
The outcome of the course is a student knows the typical components used in digital technology and is able to analyse and design logic, sequential and other basic circuits used in digital technology. The content of the course is 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.		

IM00AD62	**Electrophysics**	3
After the course a student should know the fundamental laws of electromagnetic theory and with the significance of these laws the student can solve technical applications of electromagnetism. The content f the course is: Introduction to the laws of Coulomb, Gauss, Schuster, Ohm and Kirchhoff, Joule, Lorentz, Biot-Savart, Ampere-Laplace, Ampere, Faraday and Lenz. These laws govern electrostatics, direct current electric circuits, magnetic fields, electromagnetic induction with its important practical applications, and alternating current electric circuits.		

AVA1040	**Fundamentals of Web Development**	5
On the course a student learns to write simple static and dynamical Web pages and gets to know common Web development technologies. The content of the course is: Introduction; HTML; CSS; JavaScript; PHP & MySQL; Special Topics.		

IT00AE46	**Python programming**	3
The prerequisite to take the course is a student should already know basics of some programming language. After completing this course, a student can use Python to create smaller applications and knows how to use basic Python libraries. The content of the course is: Basics of Programming with Python (introduction, python tool, data types, variables, operators, decision making and loops, arrays, functions); OOP Classes and objects; GUI Applications with Python; Creating GUIs with Python (Libraries Tkinter), Usage, Examples, Exercises; Special features Testing & Debugging, Python Main Modules: introduction, Exceptions: introduction File IO: introduction Pygame: introduction.		

ITK1042	**Communication Technology**	3
After completing the course, a student knows the basic data transfer and to gain an insight into the opportunities that data transfer offers and has the ability to make justified selections between the available data transfer options. The content of the course is: Basics of data transfer networks. Communication networks. Telecommunication and added value services. Examples of data solutions.		

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Spring 2023

Component code	Component Title	ECTS
TL1030	**Integral Calculus**	3
After the course a student should know how to apply integral calculus methods in professional studies and how to solve demanding e.g. dimensioning tasks. The main topics are basic integration formulas, with substitution integration, rational function integration, applications of integral, partial derivatives, total differential, and the implicit derivative of a function with multiple variables and extremes, gradient. The basics of differential equations are also studied.		
TIK1099	**Linux Essentials**	5
The outcome of the course is a student gets practical Linux skills and ability to take benefits of the possibilities of open source operating systems. The objective is the understanding the criteria that should be considered when selecting operating systems for different applications. Linux is used in many different platforms like servers, phones, cars and embedded systems. Also, many cloud services are backed by Linux. The technical quality and the fact that Linux is free of charge are the main reasons behind its success and popularity in many platforms. Linux based operating systems and free open source applications are also available to personal computing devices.		
IM00AD64	**Laboratory Practices in Physics**	3
After the course a student should know basic experimental physical measurements. Laboratory works on mechanics, thermophysics, electricity, magnetic induction and radiation lead the student to routine methods of measurements while working in small lab-groups. Students learn the fundamental measuring equipment, methods and routines, and is able to estimate the uncertainties of the results. Compilation of written reports is also a part of these laboratory exercises.		
ITK1039	**Object-Oriented Programming**	5
Integral set of two courses together with Object-Oriented Modelling. It is impossible to take these courses separately. The content of the course is the essential concepts in object-oriented programming; Class design and implementation based on requirements; Design of application as a composition of class collaborations; Class libraries; Unit testing.		
IT00AE38	**Electronics & electric components**	4
After completing the course, a 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. The content of the course is: 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.

IT00AC89	**UI/UX development**	5
After completing the course a student knows different prototypes (paper, digital, low-fidelity, high-fidelity), is able to design user interfaces on paper and in digital tools, is able to apply best practices for UI/UX, knows basics elements of UI (buttons, fonts, pictures) and is able to design usable user experience. The content of the course is: 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.		

ITK1032	**Embedded Systems**	6
The main topics are basic integration formulas, with substitution integration, rational function integration, applications of integral, partial derivatives, total differential, and the implicit derivative of a function with multiple variables and extremes, gradient. The basics of differential equations are also studied.		

ITK1049	**C++ Programming Language**	4
After the course student should be able to design, implement and code a computer program using C++ programming language on the intermediate level. The content of the course is: 1. Types and declarations; 2. Pointers, arrays and structures; 3. Expressions and statements; 4. Functions; 5. Namespaces and exceptions; 6. Source files and programs; 7. Abstraction mechanism; 8. Standard template library; 9. Standard structures and algorithms; 10. Development, design, programming.		

IT00AC91	**Secure application development**	3
After completing the course, a student knows the principles of developing web applications, typical security issues that are related to such applications, and how such issues are discovered and mitigated.		

IT00AE43	**Basics of mobile software development**	5
After completing the course, a student is able to explain the mobile platforms and knows most common device types, follow the design procedure and steps from an idea to a mobile application, setup development environment for mobile application development, find technical documentation from the Internet to support development, implement simple applications on a chosen mobile platform, use mobile device emulators in development and knows how to debug application in a device and use native resources of a device, like storage and camera. The participant of the course should also know about application life cycle and the view model of OS, how to distribute mobile applications to public and how to implement network operations and operate with back-end applications.		

IT00AE39	**Fundamentals of cloud services**	5
After completing the course, a student knows foundations of cloud computing, their architectures, services, and possibilities. A student is familiar with cloud services, security, architecture, pricing, and support Student has a strong understanding of cloud infrastructure		

ITK1046	**Modelling Techniques**	3
After completing the course, a student can use UML diagrams to model software. The content of the course: UML, decision tree, data dictionary, ER.		

TIK1092	**CCNA R&S: Introduction to Networks**	5
The outcome of the course is a student acquires basic knowledge and skills regarding concept, operation and construction of local area networks. The content of the course is architecture and construction of the Internet and computer networks, IP addressing and Ethernet basics, Building and configuration of a small network.		

TL1040	**Entrepreneurship**	3
Making a Business Plan individually or in a group.		

IT00AC90	**RESTful web services**	5
During this course, the students will get familiar with modern web development and REST application interfaces. The course concentrates on the application and all its parts, including both the back end and front end, as well as databases and combination of all these parts. With these tools the student can create a proper full stack RESTful web service.		

IT00AE36	**Fundamentals of IoT**	5
After completing the course, a student is able to define the term IoT. The student identifies the main technologies of IoT systems, such as data collection/sensors, data transfer and data processing (computer, microcontroller, embedded). Finally, the student knows IoT valuechain.		