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University of Applied Sciences

Information Technology

Autumn 2023 (For spring, scroll down!)

Component code	Component Title	ECTS
TL1042-3008	**Leadership**	**3**
Goal: The student knows the factors that affect people's work behaviour when one works as a manager or an employee, as an individual or as part of a group. Content: The contents of the course are the basics of work psychology and reviewing management methods.		
IT00AE40-3002	**Cloud-based data applications**	**5**
Goal: To learn how to use cloud applications together with data to develop new solutions. Content: On the course students learn how to use data that is stored in the cloud to develop new applications. How to process the data, like filtering, merging, etc. Students also learn how to create applications that work in cloud.		
IT00AE41-3001	**Artificial intelligence solutions**	**5**
Goal: To learn how to develop artificial intelligence solutions Content: What is artificial intelligence, how it works, what can it do and what not. How to develop artificial intelligence solutions to provide value to users.		
IT00AE44-3001	**Advanced mobile software development**	**5**
Goal: To learn how to develop a mobile software project Content: On this course students work quite independently and develop a mobile software as teams. Project is advanced course so students need to have basics skills of mobile development		
IT00AE36-3002	**Fundamentals of IoT**	**5**
Goal: To lean basics of IoT Content: 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.		
ITK1028-3004	**Electric Circuits**	**3**
Goal: The 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. Content: Direct current circuits, components, markings, basic laws. Alternate current circuits, indicator calculus and power concepts. Calculation methods of electrical circuits. Safety Regulations		
ITK1050-3007	**Object-Oriented Modeling**	**3**
Goal: The student knows how to improve software development skills. Content: Object-orientated modelling fundamentals. Modelling tools, modelling as part of software development. 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.		
ITK1046-3005	**Modelling Techniques**	**3**

Goal: Student can use UML diagrams to model software. Content: UML, decision tree, data dictionary, ER.		
ITK1035-3005	**Operating Systems**	**4**
Goal: After completing the course student should understand the basic concept of the architecture of computer system including processor, memory and input/output elements; Be aware of important characteristics of modern operating systems e.g. Windows, Linux etc.; Understand the objectives and functions of an operating system; Understand concepts of instruction cycle, instruction execution, procedure calls and interrupts; Understand the role of processes in an operating and their description in the operating systems; Know how to create and control processes of an operating system programmatically; Understand the thread-based architecture of processes; Know how to create, control and terminate threads; Understand principles and methods of sharing resources as well as processes and threads concurrency. Content: 1. Computer system overview; 2. Operating system overview; 3. Processes description and control; 4. Thread description and control; 5. Exclusion and synchronisation		
ITK1031-3004	**Digital Techniques**	**6**
Goal: The 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. Content: Number systems, Boolean algebra, gate circuits, combination logic, commercial microcircuits and circuit families, sequental circuits, accumulators and shift registers, memory circuits, graphic symbols and design examples.		
ITK1049-3005	**C++ Programming Language**	**4**
Goal: After the course student should be able to design, implement and code a computer program using C++ programming language on the intermediate level. Content: 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		
IT00AL05-3001	**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 knows 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		
IT00AC90-3006	**RESTful web services**	**5**
Goal: After completing course student know how REST works and how to develop Restful web services Content: 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.		
TL1041-3010	**Industrial Economics**	**5**
Goal: The student knows the fundaments of industrial operations, central concepts, methods and modes of working within a company.		

Content: The main topics are business economics, the characteristics of company analysis, expense concepts, contribution margin calculation, product-specific expense calculus, budgeting and investment calculations.		
TL00AL20-3001	**Differential Calculus**	**3**
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		
TL00AL35-3001	**Electromagnetism**	**3**
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		
IT00AI33-3004	**Algorithms and datastructures**	**5**
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, Djikstra's and Floyd-Warshall algorithms and understand their basic functionality; is familiar with other common / popular algorithms Content: Algorithms and their performance; Different datastructures; Recursion; Lists, stacks, queues, trees, binary trees, graphs; Search and sort methods; Popular / common algorithms		
IT00AL02-3002	**Fundamentals of electronics**	**3**
Goal: 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. Content: 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.		

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Spring 2024

Component code	Component Title	ECTS
TL1040-3006	**Entrepreneurship**	**3**
Goal: The student knows an overview of entrepreneurship and its relevance for the society. Content: Different business systems, the structure of business, starting a new business, marketing.		
IT00AE93-3003	**Scripting and functional programming**	**3**
Goal: To learn what is scripting, where to use it and how. Content: Course goes through fundamentals of scripting, its use-cases and scripting process. Course will teach students the selected scripting language.		
IT00AE40-3002	**Cloud-based data applications**	**5**
Goal: To learn how to use cloud applications together with data to develop new solutions. Content: On the course students learn how to use data that is stored in the cloud to develop new applications. How to process the data, like filtering, merging, etc. Students also learn how to create applications that work in cloud.		
IT00AE43-3002	**Basics of mobile software development**	**5**
Goal: To learn the basic concept of mobile development and how to apply them in practice Content: 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.		
IT00AE36-3003	**Fundamentals of IoT**	**5**
Goal: To lean basics of IoT Content: 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.		
IT00AE39-3003	**Fundamentals of cloud services**	**5**
Goal: Student knows fundamentals of cloud concepts and services, including: Economics and billing; General cloud infrastructure; Computing and storage / database resources; Students know how security is managed in cloud; Students is familiar with general cloud architecture; Students knows how cloud solutions scale and how they can be monitored Content: Contents are distributed in to following modules: Cloud Concepts Overview; Cloud Economics and Billing; Global Infrastructure Overview; Cloud Security; Networking; Compute; Storage; Databases; Cloud Architecture; Automatic Scaling and Monitoring. Course is based on AWS Academy		
IT00AC91-3003	**Secure application development**	**3**
Goal: To learn how to secure applications on code level		

Content: 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.		
IT00AE38-3004	**Electronics & electric components**	**4**
Goal: To learn fundamentals of electronics and it's most important components Content: 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.		
ITK1040-3004	**C Programming Language**	**4**
Goal: After the course is completed; Student shall understand role and importance of programming languages in software development process; Student shall be able to use for own purposes Visual Studio 2015 for programming in C language; Student shall understand the structure of the source code of a program; Student shall be able to apply pre-processing directives in programs which are being developed; Student shall know how to perform input / output operations; Student shall understand how to allocate memory; Student shall understand the role of data types as well as how to apply in programs primitive, compound and structured data types; Student shall understand C language operators and expressions; Student shall understand the flow control of a program; Student shall know how to design and use in a program functions. Content: Introduction; Program building blocks; Flow control; Pointers and functions; Compound data types; Input output.		
IT00AE41-3002	**Artificial intelligence solutions**	**5**
Goal: To lean how to develop artificial intelligence solutions Content: What is artificial intelligence, how it works, what can it do and what not. How to develop artificial intelligence solutions to provide value to users.		
IT00AL54-3001	**Internet of things**	**4**
Goal: The student is able to define the term IoT. The student identifies the main technologies of IoT systems: Data collection / sensors; Data transfer; Data processing (computer, microcontroller, embedded). The students knows IoT valuechain. The student understands the business opportunities of IoT: The right information in the right place; The information may be used in ways other than those for which it was originally intended; Data processing/refining; Remote control; Remote monitoring; Security. The student understands the difference between (information) content and the structure of (information) content. The student can implement a IoT solution Content: Use-cases of Internet of things; IoT –applications and different phases: Data collection; Data transfer; Data processing and management; IoT valuechain; Implementation of IoT application		
TL00AK71-3004	**Functions**	**3**
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.		
IT00AL10-3003	**Object-Orientated programming and modelling**	**5**

Goal: After completing the course student: knows the practices for object oriented programming and how to use it when programming; can create a project with proper structure and are able to run tests in the correct folder; can use dictionaries as data storage and understands hash's; can use basic library functions like random strings and numbers; can handle exceptions, read, and write (to and from) files, and use these in problem solving; can create small graphical interfaces for your programs. Content: Object oriented programming; Interfaces; Inheritance; Comparisons; Randomness; Graphical user interfaces		
TL00AL29-3004	**Mechanics**	**4**
Goal: The student recognizes translational and rotational motion, and is familiar with the central quantities and units in mechanics. The student is able to explain and solve problems related to mechanics and energy. Content: Kinematics, dynamics of point-like and rigid bodies, work, conservation of energy and momentum, elasticity, statics of fluids.		
IT00AL58-3003	**IP networks**	**4**
Goal: The student: Understand the structure of IP networks and how they operate; Understand how the Internet consists of numerous IP networks and related services interconnected through carrier networks; Can choose the appropriate settings for devices and systems to connect to IP networks; Can evaluate services related to IP networks and make informed choices between them; Can assess security threats related to IP networks and ways to prepare for them. Content: The structure of IP networks and the Internet; TCP / IP architecture; Protocols and services that are central to TCP/IP; Client / Server applications; Security		
IT00AL04-3003	**Relational databases and SQL**	**5**
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		
IT00AL02-3002	**Fundamentals of electronics**	**3**
Goal: 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. Content: 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.		
TL00AL31-3005	**Thermodynamics**	**2**
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.		