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University of Applied Sciences

Information Technology

Autumn 2024

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IT00AL13	ICT entrepreneurship	3
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Spring 2025

Component code	Component Title	ECTS
IT00AK60	Applied artificial intelligence	6
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IT00AS78	Tools of software development	2
Goal: The student is able to use: Version control tools, Command line tool, Editors, Project management tools, Communication tools, Documentation tools. 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		
IT00AS6	Fundamentals of programming	5
Goal: After completing the course a student: - 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. Content: Printing and reading; Variables; Calculations; Conditional and comparison; Repetition and loops; Functions: Lists: Arrays: Strings: Introduction to object orientated programming		
IT00AL13	ICT entrepreneurship	3
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.		
IT00AK57	Cloud foundations and operations	5
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)		
IT00AK64	Intelligent devices	6
The student is able to explain: -Basics of robotics. -The definition of smart devices. -Smart device applications. The student is able to conceive and design an intelligent system: -Costs -Workload estimates -Standard -Features -Implementation plan The student is able to implement the designed intelligent system: -Required components.		

-Required software and tools.
-Programming.
-Testing.

IT00AL54	Internet of things	4

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

Previous knowledge
Student knows fundamentals of programming
Student is familiar with electronics and electrical components

IT00AL02	Fundamentals of electronics	3

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.

IT00AN01	Fundamentals of Python programming	3

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

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 understands the meaning of exceptions.
Student can use files in Python programs.
Student understands basics of testing.

IT00AL11	Basics of web development	5

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.

ITK1035	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 synchronization		

ITK1031	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	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		

TL00AL20	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		

IT00AI33	Algorithms and data structures	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		

Spring 2025

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IT00AK60	Applied artificial intelligence	6
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		
IT00AK62	Mobile software development	6
Role of mobile software development, use-case, possibilities, and restrictions Mobile platforms as well as Android and iOS ecosystems Learn how to design and program a mobile application: – How to fetch data from back-end service – How to store data to mobile phone – How to unit test and debug your app – How to implement navigation – How to design UI screens from components – How to use native resources of mobile devices Deployment and publishing of mobile applications Previous knowledge requirements: Students knows fundamentals of programming and is familiar with common software development tools like Git. Student knows fundamentals of databases Students is familiar with prototyping and UI development		
IT00AL02	Fundamentals of electronics	3
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.		
IT00AL54	Internet of things	4
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 Previous knowledge Student knows fundamentals of programming Student is familiar with electronics and electrical components		
IT00AC91	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.		

ITK1040	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.		

TL00AK71	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	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		

IT00AL58	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	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	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	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.		
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 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		