Course Title	Foundations of Computing				
Course Code	ACSC110				
Course Type	Compulsory				
Level	BSc (Level 1)				
Year / Semester	1st (Fall)				
Teacher's Name	Dr Constantinos Tatas, Dr Efthyvoulos Kyriacou				
ECTS	5	Lectures / week	2	Laboratories/week	2
Course Purpose	The course aims to introduce Computer Science and Computer Engineering students in the discipline of Computing, as the discipline that seeks a scientific foundation for topics such as computer systems and architecture, algorithmic processes, data storage and manipulation, operating systems, computer networks and the Internet, algorithms and computer programming, as well as other concepts such as software engineering, databases, computer graphics, AI, the history and future of Computing. The course considers the key concepts of modern computer systems and builds on both theoretical and practical level the fundamentals of Computing.				
Learning Outcomes	By the end of the course, the students are expected to: 1. Describe and understand the different aspects and principles of Computing, as well as the history of computing, and how computers are contributing the modern era. 2. Examine and apply number and data conversion techniques and understand the importance of binary coding and the operations permitted on binary digits. 3. Describe and distinguish the different areas of Computing and appreciate the value and contribution of each area. 4. Explain how the various areas of Computing complete the sphere of knowledge for Computer Science and Computer Engineering students. 5. Demonstrate basic knowledge of the function of the basic components and peripherals of a computer, to providing solutions in troubleshooting computer software, hardware, and peripheral devices.				
Prerequisites	None		Co-requisites		None
Course Content	• **Introduction to Computing:** Define the Turing model of a computer, the von Neumann model of a computer, the three components of a computer: hardware, data, and software, topics related to computer hardware, data, software, discuss some social and ethical issues related to the use of computers, and a short history of computers. • **Computer Systems:** Hardware: digital logic level, CPU, memory Input / Output and peripheral devices. Software: programming languages, compilers/interpreters, operating system, and application software.				

	• **Number Systems:** Number systems, non-positional and positional number systems, decimal, binary, hexadecimal, and octal system, convert a number in binary, octal, or hexadecimal to a number in the decimal system, convert a number in the decimal system to a number in binary, octal, and hexadecimal, convert a number in binary to octal and vice versa, convert a number in binary to hexadecimal and vice versa, find the number of digits needed to represent a particular value. • **Data Storage:** List different data types used in a computer, describe how different data is stored inside the computer as bit patterns, such as integers, unsigned integers, sign-and-magnitude, two's complement, real numbers and floating-point format, text, encoding systems, other forms of data such as audio, raster images, vector images, graphics schemes, video, video codecs. • **Data Operations:** Operations performed on data, unary and binary logic operations, logic shift operations and arithmetic shift operations, addition and subtraction on integers in sign-and-magnitude, two's complement, floating-point format. • **Computer Organisation:** Computer subsystems, central processing unit (CPU), the fetch-decode-execute phases of a cycle, main memory and address space, cache memory, input/output subsystem, interconnection of subsystems, and different bus systems, methods I/O addressing, major trends in the design of computer architecture, pipelining, and overview of parallel processing. • **Overview of Computing Topics:** Overview of the different aspects in Computing, Operating Systems, Database Systems, Computer Networks and the Internet, Algorithms and Programming Languages, Software Engineering, Theory of Computation, and Artificial Intelligence. • **Laboratory Work:** Safety procedures, lab rules and regulations, computer assembly, operating system installation, preventive maintenance and troubleshooting, dual boot, VMs, Windows and Linux operating systems use and administration.
Teaching Methodology	The taught part of course is delivered to the students by means of lectures, conducted with the help of computer presentations. Lecture notes and presentations are available through the e-learning platform and the web for students to use in combination with the textbooks. Lectures are supplemented with laboratory work. During laboratory sessions, students are instructed to assemble a computer from hardware parts. Students are then able to install and troubleshoot operating systems (Windows and Linux) and computer software, and use the Linux operating system command line interface.
Bibliography	Textbooks: • G. Brookshear, and D. Brylow, "***Computer Science: An Overview***", 13th Edition**,** Pearson", 2019, ISBN: 978-1292263427. References: • Forouzan Behrouz, "***Foundations of Computer Science***", 3rd Edition, Cengage Learning, 2018, ISBN: 978-1-4080-8841-8. • Nell Dale, John Lewis, "***Computer Science Illuminated***", 7th Edition,

	Jones and Bartlett, 2019, ISBN: 978-1284155617.
Assessment	The assessment of the course includes two written tests to cover the theoretical aspects of the course, a set of lab assignments that cover the practical aspects of the course as described above, and two lab tests to assess the students' knowledge obtained during labs. The weights for each assessment component are: • Tests: 60% • Laboratory Work: 30% • Lab Tests: 10%
Language	English