Course Title	Introduction to Computer Science via Robotics				
Course Code	CSE105				
Course Type	Compulsory				
Level	Bachelor (1st cycle)				
Year / Semester	1st year / 1st semester				
Teacher's Name	TBA				
ECTS	6	Lectures / week	3 hours / 14 weeks	Laboratories / week	None
Course Purpose and Objectives	The purpose of this course is to provide students with an overview of the computer science discipline and assist students in understanding theoretical concepts and areas of study as well as application of computer science. One objective of the course is to enable student to gain an appreciation of computer scientists in society. Additionally the course will provide a first contact with the area of robotics through practical sessions.				
Learning Outcomes	• Explain the importance of the computer science discipline • Provide examples of the important role and ethical responsibility of computer scientists in our society • List the key areas of study in computer science and discuss their interrelationships • Describe number system as used in computer science and perform conversions between them • List and explain logical gates and integrated circuits how they are used as a basis for computing • Outline differences between different paradigms of high level programming languages • Describe network types; explain communications using networks, the internet and the World Wide Web.				
Prerequisites	None		Co-requisites		None
Course Content	The Computer Science discipline: Define the term 'Computer Science' and describe the difference between Computer Science and other related disciplines. Brief history of Computer Science. The Computer Scientist: Describe the main Computer Science fields of study and related careers. Understand what is needed by a Computer Science student in order to become a professional Computer Scientist. Understand the ethical responsibilities of Computer Scientists. Comprehend the difference between a computer scientist and a computer programmer, software engineer, information scientist, etc.				

	Information and data representation. Number systems and positional notation; decimal; binary; octal; hexadecimal; decimal systems basic operations; relationships and conversion between systems. Analog and digital information, compression and compression ratio, ASCII and Unicode sets, number representation, sound representation, color representation, graphics representation, video representation. . Hardware related concepts. Computers and electricity; Logic gates, transistors, integrated circuits; Boolean expressions, truth tables; logic diagrams; constructing solutions: Half-adders, multiplexers and generations of integrated circuits. Computer components; the von Neumann machine; input, output, memory; control unit; arithmetic logic unit; the fetch-decode-execute cycle; computer memory types and organization; storage devices; HDDs, SSDs, USB sticks; touch screen technologies; parallel computing; embedded systems Algorithms and problem Problem solving and the problem solving process; data types; data structures; recursion; arrays; sorted and unsorted arrays; sorting algorithms: bubble sort, selection sort, insertion sort; quicksort, binary search Programming concepts Understand the concepts of programming and programming languages. Distinguish between functional and object-oriented design. Define the difference between interpretation and compilation. Understand the difference between low-level and high-level programming languages. Operating system concepts Operating systems software and application software; roles of operating system; resource management; timesharing; memory management; process management Understand the concept of an operating system and its role in a computing system. Define the main functions of an operating system (memory and process management). Understand the organizational structure of files and directories. Information systems, applications and database management systems; Getting to know and using spreadsheets; using formulas and built-in functions. Relational database model; relationships; the standard query language (SQL); basic SQL commands; entity relation diagrams. Data communications and computer networks Key aspects of a computer network; types and characteristics of networks; network topologies of local area networks; internet connection types; the internet and how it works; packet switching; network communication protocols; TCP/IP, firewalls; addressing; hostnames; IP v4 and v6 addressees. Explaining DNS and its usage. Cloud computing.

	Advanced applications: artificial intelligence; neural networks; natural language processing; robotics; simulation; using object-oriented design principles to build simulation models.
Teaching Methodology	Face-to-face
Bibliography	Dale N., Lewis J., Computer science illuminated Jones & Bartlett Learning Latest edition Brookshear G., Brylow D., Computer Science: An overview Pearson Latest edition Reed D., A balanced introduction to computer science Pearson, Latest Edition Forouzan B.A., Foundations of Computer Science Cengage learning Latest edition
Assessment	Participation 10% Coursework 20% Midterm examination 30% Final examination 40% 100%
Language	English