

UNIVERSITY OF MADRAS
B.Sc. DEGREE PROGRAMME IN COMPUTER SCIENCE
 SYLLABUS WITH EFFECT FROM 2023-2024

Year: I

Semester: I

Foundation Course: Fundamentals of Computers (Common to B.Sc.-CS with AI, CS with DS, Software Appl. & BCA)	125B1A
Credits 2	Lecture Hours: 2 per week
Learning Objectives: (for teachers: what they have to do in the class/lab/field) • to understand fundamentally the general scope of the computer system • to interact effectively with the computer • to know the uses of the basic components of the computer • to manage the system to some extent before involving an expert • to know some basic things about the computer and the world	
Course Outcomes: (for students: To know what they are going to learn) CO1: Fundamental concepts of computer CO2: Fundamental mathematical techniques and how they relate to computer CO3: The architecture of processing and file storage in a computer system CO4: Basic operations of operating systems CO5: A variety of software packages applicable to an academic, software development and business environment	

Units	Contents
I	Understanding the Computer: - Introduction - Evolution of Computers - Generations of Computers - Classification of Computers - Computing Concepts - The Computer System - Applications of Computers. Computer Organisation and Architecture: - Introduction - Central Processing Unit - Internal Communications - Machine Cycle - The Bus - Instruction Set. Memory and Storage Systems: - Introduction - Memory Representation - Random Access Memory - Read Only Memory - Storage Systems - Magnetic Storage Systems - Optical Storage Systems - Magneto Optical Systems - Solid-state Storage Devices - Storage Evaluation Criteria. Input Devices: - Introduction - Keyboard - Pointing Devices - Scanning Devices - Optical Recognition Devices - Digital Camera - Voice Recognition System - Data Acquisition Sensors - Media Input Devices. Output Devices: - Introduction - Display Monitors - Printers - Impact Printers - Non-impact Printers - Plotters - Voice Output - Systems - Projectors - Terminals
II	Computer Codes: - Introduction - Decimal System - Binary System - Hexadecimal System - Octal System - Binary Coded Decimal (BCD) Systems – Unicode. Computer Arithmetic: - Introduction - Binary Addition - Binary Multiplication - Binary Subtraction - Binary Division - Signed/unsigned Numbers - Complements of Binary Numbers - Binary Subtraction Using Complements - Representing Numbers - Integer Arithmetic - Floating-point Arithmetic

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III	Boolean Algebra of Switching Circuits: - Introduction - Elements of Boolean Algebra - Basic Postulates of Boolean Algebra - Boolean Operations - Principle of Duality - Basic Laws of Boolean Algebra - De Morgan's Theorem - Boolean Expressions. Logic Gates and Digital Circuits: - Introduction - Basic Logic Gates - Derived Logic Gates - Conversion of Boolean Functions - Adder Circuits - Flip-flop Circuits - Application of Flip-flops. Computer Software: - Introduction - Types of Computer Software - System Management Programs - System Development Programs - Standard Application Programs - Unique Application Programs - Problem Solving - Structuring the Logic - Using the Computer
IV	Operating Systems: - Introduction - History of Operating Systems - Functions of Operating Systems - Process Management - Memory Management - File Management - Device Management - Security Management - Types of Operating Systems - Providing User Interface - Popular Operating Systems. Programming Languages: - Introduction - History of Programming Languages - Generations of Programming Languages - Characteristics of a Good Programming Language - Categorisation of High-level Languages - Popular High-level Languages - Factors Affecting the Choice of a Language - Developing a Program - Running a Program
V	Data Communications and Networks: - Introduction - Data Communication Using Modem - Computer Network - Network Topologies - Network - Protocols and Software - Applications of Network. The Internet and World Wide Web: - Introduction - History of Internet - Internet Applications - Understanding the World Wide Web - Web Browsers - Browsing the internet - Using a Search Engine - Email Service - Protocols Used for the Internet

Learning Resources:

Recommended Texts

1. E Balagurusamy. Fundamentals Of Computers, Tata McGraw Hill Publishing Company Limited
2. Fundamentals of Computers (Paperback), 2019, Manaulah Abid, Mohammad Amjad, Dreamtech Press