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

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,Manaullah Abid, Mohammad Amjad, Dreamtech Press