UNIVERSITY OF LADAKH

SYLLABUS

OF

THE FOUNDATION COURSE

OF

Computer Science

(UNDER NEP – 2020)

(Implemented w.e.f Academic Session 2023-24)

UNIVERSITY OF LADAKH

SYLLABI OF THE FOUNDATION/INTRODUCTORY COURSE IN COMPUTER SCIENCE
UNDER NATIOANL EDUCATION POLICY - 2020
(Session 2023-2024)

Semester – I   **Max Marks – 75**

Course Title: Basic Computing   **Credit – 3**

Course Code: CMS-CS-101-M

Objective:

The Basic Computing course serves as a fundamental foundation for students studying computer science, providing them with knowledge of essential topics like computing, data representation, algorithms, operating systems, internet, computer architecture and programming, as well as basic skills in working with computer systems. The course also provides an overview of Machine Learning

Unit – 1:

Introduction to Computing - Computer Systems, Components of a computer system, Hardware and software, Evolution and generations of computers, and Classification of computers on the basis of capacity, purpose, and generation.

Data representation in digital computer. Number System: Bit, byte, binary, decimal, octal systems and hexadecimal conversion from one system to the other, representation of characters, integers and fractions. Binary Arithmetic: Addition, subtraction and multiplication. Computer Codes - BCD, Gray Code, ASCII and Unicode

Unit – 2:

Problem Solving – Approaches: top-down and bottom-up programming. Algorithm, Flowchart, Pseudocode and Source Code. Representation of Algorithm, Flowchart, Pseudo code and Source Code with examples. Transformation of Algorithms into source code.

Algorithms: Algorithms in Computing, Algorithms as a technology, analysing algorithms, Designing algorithms, Growth of Functions.

Computer languages: - Machine language, assembly language, higher level language, 4GL. Translator Programs - Compiler, Interpreter, Assembler

Unit – 3:

Operating Systems: - Introduction, Features, Functions - Process Management, Memory Management, File Management, Device Management etc. Different types and classification of Operating Systems. Introduction to different Operating Systems.

Data Base Management System: Data, Information and Knowledge. Database, database management system, Structured and Unstructured data. Big Data. Different kinds of databases.

Operating Systems: - Introduction, Features, Functions - Process Management, Memory Management, File Management, Device Management etc. Different types and classification of Operating Systems. Introduction to different Operating Systems.

Data Base Management System: Data, Information and Knowledge. Database, database management system, Structured and Unstructured data. Big Data. Different kinds of databases.

Internet: History of Internet, Features and uses of Internet. The Internet Architecture, IP Address, Domain Name. Managing the Internet. Introduction to WWW, Web browsers, Websites, Email, Search Engine etc.

Course Outcomes:

Upon completion of this course, students will be able to:

1. Demonstrate a clear understanding of the fundamental components of a computer system, including hardware and software

2. Use number systems such as binary, decimal, octal, and hexadecimal, and perform binary arithmetic operations such as addition, subtraction, and multiplication.

3. Apply problem-solving approaches such as top-down and bottom-up programming, and transform algorithms into source code using different programming languages and translator programs such as compilers, interpreters, and assemblers.

4. Analyze and evaluate operating systems based on their features and functions. Apply different techniques for process, memory, file, and device management.

5. Evaluate different types of databases and explain the history and architecture of the internet

References:

Essential Readings –

1. **Sinha. P.K (2018)** , "Computer Fundamentals and Programming in C", **Vikas Publishing House Pvt Ltd, New Delhi**

2. **Basandra. S. K (2021),** "Computer Fundamentals and Programming in C", **XYZ Publishers, New Delhi**.

3. **Stallings. W (2018)** , "Computer Organization and Architecture: Designing for Performance, Tenth Edition", **Pearson Education, Boston**

Suggested Readings –

1. **Tanenbaum. A.S (2015)** , "Modern Operating Systems, Fourth Edition", **Prentice Hall, New Jersey**

2. **Korth. H.F (2016)** , "Database System Concepts, Seventh Edition", **McGraw-Hill Education, New York**

3. **Murphy. R (2019)** , "Artificial Intelligence: A Modern Approach, Third Edition", **Pearson Education, Boston**

Semester – II   Credit – 3
Course Title: Introduction to GUI Based Operating System
Course Code: CMS-CS-201-M   Max Marks – 75

Objective:

The course shall provide a comprehensive understanding of operating systems. The students will learn about the basic functions of an operating system, including resource abstraction and management, and the different types of operating systems. Additionally, students will gain an understanding of process management, memory management, and file and I/O management techniques, as well as protection and security policies. The course shall enable students to evaluate and analyse different operating system mechanisms and solve issues related to process management, memory management, and file and I/O management.

Unit – 1:

Introduction: Basic OS functions, resource abstraction, types of operating systems- multiprogramming systems, batch systems, time sharing systems; operating systems for personal computers & workstations, process control & real time systems,

Operating System Organization: Processor and user modes, kernels, system calls and system programs

Unit – 2:

Process Management: System view of the process and resources, process abstraction, process hierarchy, threads, threading issues, thread libraries; Process Scheduling, non-pre-emptive and pre-emptive scheduling algorithms; concurrent and processes, critical section, semaphores, methods for inter-process communication; deadlocks.

Unit – 3:

Memory Management: Physical and virtual address space; memory allocation strategies
–fixed and variable partitions, paging, segmentation, virtual memory.

File and I/O Management: Directory structure, file operations, file allocation methods, device management

Protection and Security: Policy mechanism, Authentication, Internal access Authorization.

Course Outcomes:

Upon completion of this course, students will be able to:

1. Demonstrate a clear understanding of the basic functions, principles, and mechanisms of operating systems.
2. Analyze and evaluate different types of operating systems, including multiprogramming, batch, time-sharing, and real-time systems.

3. Solve problems related to process management, memory management, file and I/O management, and protection and security policies in operating systems.

4. Evaluate and apply different techniques for memory allocation, scheduling algorithms, inter-process communication, and deadlock resolution.

5. Develop the necessary skills and knowledge to design and implement efficient and effective operating systems, using appropriate tools and technologies

References:

Essential Readings –

1. **Silberschatz, A., Galvin, P. B., & Gagne, G. (2018),** "Operating System Concepts", **Wiley India Pvt Ltd, New Delhi**

2. **Tanenbaum, A. S., & Bos, H. (2014),** "Modern Operating Systems", **Pearson Education India, New Delhi**

3. **Stallings, W. (2014),** "Operating Systems: Internals and Design Principles", **Pearson Education India, New Delhi**

4. **Abraham Silberschatz, P. B. Galvin, & Greg Gagne (2020),** "Operating System Concepts Essentials", **Wiley India Pvt Ltd, New Delhi**

5. **Dhamdhere, D. M. (2011),** "Operating Systems: A Concept-Based Approach", **McGraw-Hill Education (India) Pvt Ltd, New Delhi**

Suggested Readings -

1. **Garg, R. (2018),** "Operating Systems", **Khanna Publishers, New Delhi**

2. **Deitel, P., & Deitel, H. (2015),** "Operating Systems", **Pearson Education India, New Delhi**

3. **Singhal, M., & Shivaratri, N. G. (2019),** "Advanced Concepts in Operating Systems", **McGraw Hill Education (India) Private Limited, New Delhi**

4. **Crowley, P. (2019),** "Modern Operating Systems: Global Edition", **Pearson Education Limited, New Delhi**