



ORIENTAL EDUCATION SOCIETY'S

SANPADA COLLEGE OF COMMERCE & TECHNOLOGY

Affiliated to The University of Mumbai

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**PROGRAMME OUTCOME AND COURSE OUTCOMES
OF
Bachelor of Science (Computer Science)
(B.Sc. CS)**

**ORIENTAL EDUCATION SOCIETY'S
SANPADA COLLEGE OF COMMERCE AND
TECHNOLOGY**

**Address : PLOT NO. 3,4,5, SECTOR 2, SANPADA (W), BEHIND SANPADA RAILWAY
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COURSE TITLE: Digital Systems & Architecture

CO 1: students would be able

To learn about how computer systems, work and underlying principles

To understand the basics of digital electronics needed for computers

To understand the basics of instruction set architecture for reduced and complex instruction sets

CO 2: To understand the basics of processor structure and operation

To understand how data is transferred between the processor and Devices

COURSE TITLE: Introduction to Programming with Python

CO 1 :students would be able to learn the

Ability to store, manipulate and access data in Python

Ability to implement basic Input / Output operations in Python

Ability to define the structure and components of a Python program.

CO 2: Ability to learn how to write loops and decision statements in Python.

Ability to learn how to write functions and pass arguments in Python.

Ability to create and use Compound data types in Python

COURSE TITLE: Linux Operating System

CO 1: students would be able to Work with Linux file system structure, Linux Environment. Handle shell commands for scripting, with features of regular expressions, redirections. Implement file security permissions

CO 2: Work with vi, sed and awk editors for shell scripting using various control structures. Install software's like compilers and develop programs in C and Python programming languages on Linux Platform

COURSE TITLE: Open Source Technologies

CO 1: Differentiate between Open Source and Proprietary software and Licensing.
Recognize the applications, benefits and features of Open-Source Technologies

CO 2: Gain knowledge to start, manage open-source projects.

COURSE TITLE: Discrete Mathematics

CO 1: Learners would be able to:

Define mathematical structures (relations, functions, graphs) and use them to model real life situations. Understand, construct and solve simple mathematical problems. Solve puzzles based on counting principles.

CO 2: Provide basic knowledge about models of automata theory and the corresponding formal languages. Develop an attitude to solve problems based on graphs and trees, which are widely used in software.

COURSE TITLE: Descriptive Statistics

CO 1: learners would be able to

Organize, manage and present data. Analyze Statistical data using measures of central tendency and dispersion.

CO 2: Analyze Statistical data using basics techniques of R.

Study the relationship between variables using techniques of correlation and regression

COURSE TITLE: SOFT SKILLS

CO 1: Learners will be able to understand the importance and types soft skills

Learners will develop skills for Academic and Professional Presentations.

CO 2: Learners will able to understand Leadership Qualities and Ethics.

Ability to understand the importance of stress management in their academic & professional life.

SEMESTER II

COURSE TITLE: Design and Analysis of Algorithms

CO 1: students would be able to

Students should be able to understand and evaluate efficiency of the programs that they write based on performance of the algorithms used.

CO 2: Students should be able to appreciate the use of various data structures as per need

To select, decide and apply appropriate design principle by understanding the requirements of any real life problems

COURSE TITLE: Advanced Python Programming

CO 1 students would be able to; implement OOP concepts in Python including Inheritance and Polymorphism. Ability to work with files and perform operations on it using Python.

CO 2: Knowledge of working with databases, designing GUI in Python and implement networking in Python

COURSE TITLE: Introduction to OOPS USING C++

CO 1: students would be able to; Work with numeric, character and textual data and arrays. Understand the importance of OOP approach over procedural language.

CO 2 : Understand how to model classes and relationships using UML.

Apply the concepts of OOPS like encapsulation, inheritance and polymorphism.

Handle basic file operations

COURSE TITLE: Database Systems

CO 1: students would be able to; To appreciate the importance of database design. Analyze database requirements and determine the entities involved in the system and their relationship to one another.

CO 2: Understand the normalization and its role in the database design process. Handle data permissions.

Create indexes and understands the role of Indexes in optimization search

COURSE TITLE: Calculus

CO 1: learners would be able to; Develop mathematical skills and enhance the thinking power of learners. Understand mathematical concepts like limit, continuity, derivative, integration of functions, partial derivatives.

CO 2: Appreciate real world applications which use the learned concepts.

Skill to formulate a problem through Mathematical modeling and simulation.

COURSE TITLE: Statistical Methods

CO 1 learners would be able to; Calculate probability, conditional probability and independence. Apply the given discrete and continuous distributions whenever necessary. Define null hypothesis, alternative hypothesis, level of significance, test statistic and p value.

CO 2: Apply non-parametric test whenever necessary. Conduct and interpret one-way and two-way ANOVA.

COURSE TITLE: E-Commerce and Digital Marketing

CO 1 students would be able to; Understand the core concepts of E-Commerce.

CO 2 : Apply digital marketing through different channels and platforms

Understand the significance of Web Analytics and Google Analytics and apply the same.

SEMESTER III

COURSE TITLE: Linear Algebra

CO 1: students would be able to; Appreciate the relevance and applications of Linear Algebra in the field of Computer Science. Understand the concepts through program implementation.

CO 2: Express clear understanding of the concept of a solution to a system of equations. Find eigenvalues and corresponding eigenvectors for a square matrix.

COURSE TITLE: Data Structures

CO 1: students would be able to; Create different types of data structures.

Understand which data structure to be used based on the type of the problem.

CO 2: Apply combined knowledge of algorithms and data structures to write highly effective programs in various domains.

COURSE TITLE: Advanced Database Concepts

CO 1: students would be able to; Master concepts of stored procedure, functions, cursors and triggers and its use. Learn about using PL/SQL for data management.

CO 2: Use efficiently Collections and records.

Understand concepts and implementations of transaction management and crash recovery.

COURSE TITLE: Java Based Application Development

CO 1: students would be able to; Design basic application in java using Graphical User Interface. The learner will be able to develop applications using swings

CO 2: The learner will be able to develop web based applications using servlet and jsp. The learner will be able to connect databases with java through

The learner will be able to perform programs using JSON objects

COURSE TITLE: Principles of Operating Systems

CO 1: students would be able to Work with any type of operating system Handle threads, processes, process synchronization

CO 2 : Implement CPU scheduling algorithms

Understand the background role of memory management. Design file system.

COURSE TITLE: Web Technologies

CO 1 students would be able to; Design valid, well-formed, scalable, and meaningful pages using emerging technologies. Understand the various platforms, devices, display resolutions, viewports, and browsers that render websites. Develop and implement client-side and server-side scripting language programs.

CO 2: Develop and implement Database Driven Websites.

Design and apply XML to create a markup language for data and document centric applications.

COURSE TITLE: Green Technologies

CO 1 students would be able to; Explain drivers and dimensions of change for Green Technology. Appreciate Virtualization; smart meters and optimization in achieving green IT.

CO 2: Gain knowledge about green assets, green processes, and green enterprise architecture ISO 14001 and related standards for Audit for Green Compliance

SEMESTER IV

COURSE TITLE: Theory of Computation

CO 1: students would be able to; Understand Grammar and Languages. Learn about Automata theory and its application in Language Design.

CO 2: Learn about Turing Machines and Pushdown Automata. Understand Linear Bound Automata and its applications

COURSE TITLE: Computer Networks

CO 1: students would be able to; Learn basic networking concepts and layered architecture.

CO 2 : Understand the concepts of networking, which are important for them to be known as a 'networking professionals'.

COURSE TITLE: Software Engineering

CO 1: students would be able to Plan a software engineering process life cycle, including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements

CO 2 :Analyze and translate a specification into a design, and then realize that design practically, using an appropriate software engineering methodology.

COURSE TITLE: IoT TECHNOLOGIES

CO 1: students would be able to understand SoC and IoT. use different types of IoT Platforms and interfaces.

CO 2: understand and implement an idea of various types of applications built using IoT

COURSE TITLE: Android Application Development

CO 1: students would be able to Build useful mobile applications using Kotlin language on Android . Install and configure Android Studio for application development

CO 2 : Master basic to intermediate concepts of Kotlin required for mobile application development

COURSE TITLE: Advanced Application Development

CO 1: students would be able to Store the data in NoSQL, document-oriented MongoDB database that brings performance and scalability.

CO 2 :Use Node.js and Express Framework for building fast, scalable network applications Use AngularJS framework that offers declarative, two-way data binding for web applications.

COURSE TITLE: Research Methodology

CO 1 : students would be able to ;Define research, formulate problem and describe the research process and research methods.

CO 2 : Understand and apply basic research methods including research design, data analysis and interpretation.

Understand ethical issues in research, write research report, research paper and publish the paper.

COURSE TITLE: Artificial Intelligence

CO 1: students would be able to Demonstrate knowledge of the foundations and key concepts in the field of AI.

CO 2: Analyze and design intelligent agents for specific environments. Apply problem-solving techniques and algorithms to find solutions to different types of problems.

COURSE TITLE: Software Testing & Quality Assurance

CO 1: students would be able to; Explain the importance of software testing and its impact on software quality.

CO 2: Apply appropriate software testing techniques to identify and mitigate software defects. Design and execute test cases to verify the functionality and performance of software systems.

COURSE TITLE: Information and Network Security

CO 1: students would be able to: Analyze and evaluate security trends, attacks, and mechanisms, and propose effective security solutions based on the OSI security architecture.

CO 2: Apply classical encryption techniques, such as substitution and transposition ciphers, to encrypt and decrypt messages and analyze their security implications.

COURSE TITLE: PROJECT MANAGEMENT

CO 1: students would be able to; Apply project management principles, processes, and best practices to plan, execute, and control projects effectively.

CO 2 Develop project charters, define project scopes, and create work breakdown structures (WBS) to establish project objectives and deliverables.

COURSE TITLE: Game Programming

CO 1: Students would be able to; Apply vector manipulation techniques and transformations to create and manipulate objects in 3D space.

CO 2: Utilize industry-standard tools and technologies such as Unity and DirectX for 3D game development.

COURSE TITLE: Project Work

CO 1: Project Work as part of B.Sc. Computer Science program provides students with practical experience in applying their knowledge and skills to real-world projects, emphasizing hands-on experience in industry- standard project practices.

CO 2: It focuses on project development, implementation, and deployment using computer science principles and techniques.

SEMESTER VI

COURSE TITLE: Cyber Laws And IPR

CO 1 :students would be able to ;Demonstrate a comprehensive understanding of cyber laws and their application in the digital age.

CO 2 : Evaluate legal frameworks and regulations governing cyber laws. Identify and assess key issues in cyber laws, such as e-commerce, e-governance, and electronic records and contracts.

COURSE TITLE: Cloud Computing And Web Services

CO 1: students would be able to ; Demonstrate a comprehensive understanding of cloud computing concepts, including different types of clouds and their characteristics.

CO 2 : Implement and utilize web service technologies, such as SOAP and REST, to develop distributed and parallel computing applications.

COURSE TITLE: Information Retrieval

CO 1: students would be able to ; Explain the key components and principles of information retrieval systems. Apply indexing, storage, and retrieval techniques to efficiently retrieve relevant documents.

CO 2 : Compare and contrast different retrieval models and select appropriate models for specific search scenarios.

COURSE TITLE: Data Science

CO 1: Students would be able to ; Apply data preprocessing techniques to clean and transform raw data, handle missing values and outliers, and merge datasets.

CO 2 : Implement machine-learning algorithms to perform tasks such as regression, classification, clustering, and ensemble learning.

COURSE TITLE: Ethical Hacking

CO 1 :students would be able to ;Apply ethical hacking methodologies to conduct comprehensive security assessments and

penetration tests. Perform effective footprinting and reconnaissance techniques to gather critical information about target systems.


CO 2 :Demonstrate an understanding of ethical and legal considerations in conducting ethical hacking activities and adhere to professional codes of conduct

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