CROSS CUTTING ISSUES

NAHATA JNMS MAHAVIDYALAYA

WEST BENGAL STATE UNIVERSITY

North 24 Parganas, W.B.

B.A. Computer Science- GENERAL CBCS: 2018-19

GENDER:
ENVIRONMENT:
ETHICS:
HUMAN RIGHTS:

Semester – I (General)
Course Code: CMSGCOR01T /Course Title: Problem Solving with Computer
Core Course: Credit – 4, FM - 50

Course Content

Computer Fundamentals: Introduction to Computers: Characteristics of Computers, Uses of computers, Types, and generations of Computers.
Basic Computer Organization: Units of a computer, CPU, ALU, memory hierarchy, registers, I/O devices.
Planning the Computer Program: Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation.
Techniques of Problem Solving: Flowcharting, decision table, algorithms, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming.
Overview of Programming: Structure of a Python Program, Elements of Python Introduction to Python: Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators (Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator).
Creating Python Programs: Input and Output Statements, Control statements (Looping While Loop, for Loop, Loop Control, Conditional Statement- if...else, Difference between break, continue and pass).
Structures: Numbers, Strings, Lists, Tuples, Dictionary, Date & Time, Modules, Defining Functions, Exit function, default arguments.
Introduction to Advanced Python: Objects and Classes, Inheritance, Regular Expressions, Event Driven Programming, GUI Programming.

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Semester – I (General)
Course Code: CMSGCOR01P/ Course Title: Problem Solving with Computer
Core Course: Credit – 2, FM - 25

Course Content

Section: A (Simple programs): Understand the basic syntax and structure of Python programming. Develop simple Python programs to solve basic computational problems. Use control structures, functions, and file handling to create functional programs. Handle basic errors and exceptions in Python programs.
Section: B (Visual Python): Understand the basics of visual programming and graphics libraries in Python. Develop graphical user interfaces and visualize data using Python. Implement event-

driven programming concepts. Integrate visual components with backend logic to create interactive applications.

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Semester – II (General)
Course Code: CMSGCOR02T/ Course Title: Database Management Systems
Core Course: Credit – 4, FM - 50

Course Content

Introduction to Database Management Systems: Characteristics of database approach, Data models, DBMS architecture and data independence.
Entity Relationship and Enhanced ER Modeling: Entity types, relationships, SQL- Schema Definition, constraints, and object modeling.
Relational Data Model: Basic concepts, relational constraints, relational algebra, SQL queries.
Database design: ER and EER to relational mapping, functional dependencies, normal forms up to third normal form.

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Semester – II (General)
Course Code: CMSGCOR02P/ Course Title: Database Management Systems
Core Course: Credit – 2, FM - 25

Course Content

DDL Commands: Understand and apply DDL commands to define and manage database schemas., Create and modify database objects such as tables, indexes, and views. Implement data integrity constraints to ensure data accuracy and consistency.
DML Commands: Understand and apply DML commands to manipulate data within the database. Perform data insertion, updates, and deletions efficiently. Retrieve and filter data to generate meaningful reports and insights. Utilize joins to combine data from multiple tables.

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Semester – III (General)
Course Code: CMSGCOR03T/ Course Title: Operating Systems
Core Course: Credit – 4, FM - 40

Course Content

Introduction: System Software, Resource Abstraction, OS strategies.
Types of operating systems: Multiprogramming, Batch, Time Sharing, Single user and Multiuser, Process Control & Real Time Systems.
Operating System Organization: Factors in operating system design, basic OS functions, implementation consideration; process modes, methods of requesting system services – system calls and system programs.
Process Management: System view of the process and resources, initiating the OS, Process address space, process abstraction, resource abstraction, process hierarchy, Thread model
Scheduling: Scheduling Mechanisms, Strategy selection, non-pre-emptive and pre-emptive strategies.
Memory Management: Mapping address space to memory space, memory allocation strategies, fixed

partition, variable partition, paging, virtual memory

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Semester – III (General)
Course Code: CMSGCOR03P/ Course Title: LINUX
Core Course: Credit – 2, FM - 10

Course Content

Introduction: Linux/Unix
Basic commands: ls, pwd, tty, cat, who, who am I, rm, mkdir, rmdir, touch, cd. File manipulation commands: cal, cat, mv, cp, man, date

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Semester – III (General)
Course Code: CMSSSEC01M/ Course Title: Programming in Python
Core Course: Credit – 2, FM - 25

Course Content

Planning the Computer Program: Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation.
Techniques of Problem Solving: Flowcharting, decision table, algorithms, Structured programming concepts Programming methodologies viz. top-down and bottom-up programming.
Overview of Programming: Structure of a Python Program, Elements of Python
Introduction to Python: Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators (Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator).
Creating Python Programs: Input and Output Statements, Control statements (Branching, Looping, Conditional Statement, exit function, Difference between break, continue and pass.), Defining Functions, default arguments.

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Semester – IV (General)
Course Code: CMSGCOR04T/ Course Title: Computer System Architecture
Core Course: Credit – 4, FM - 40

Course Content

Introduction: Logic gates, Boolean algebra, combinational circuits, circuit simplification, flip-flops and sequential circuits, decoders, multiplexors, registers, counters, and memory units.
Data Representation and basic Computer Arithmetic: Number systems, complements, fixed- and floating-point representation, character representation, addition, subtraction, magnitude comparison.
Basic Computer Organization and Design: Computer registers, bus system, instruction set, timing and control, instruction cycle, memory reference, input-output, and interrupt.
Central Processing Unit: Register organization, arithmetic, and logical micro-operations, stack organization, micro programmed control.
Programming the Basic Computer: Instruction formats, addressing modes, instruction codes, machine language, assembly language, input output programming.

Input-output Organization: Peripheral devices, I/O interface, Modes of data transfer, direct memory access

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Semester – IV (General)
Course Code: CMSGCOR04P/ Course Title: Computer System Architecture
Core Course: Credit – 2, FM - 10

Course Content

Overview: Overview of computer systems.
Basic components: CPU, memory, I/O devices, Introduction to binary numbers and logic gates

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Semester – IV (General)
Course Code: CMSSSEC02M/ Course Title: R Programming
Core Course: Credit – 2, FM - 25

Course Content

Introduction: Overview and History of R, Getting Help, Data Types, Subletting, Vectorized Operations, Reading and Writing Data
Control Structures, Functions, lapply, tapply, split, mapply, apply, Coding Standards
Scoping Rules, Debugging Tools, Simulation, R Profiler.

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Semester – V (General)
Course Code: CMSGDSE01T/ Course Title: Programming in Java
Core Course: Credit – 6, FM - 75

Course Content

Introduction to Java: Features of Java, JDK Environment Object Oriented Programming Concept Overview of Programming, Paradigm, Classes, Abstraction, Encapsulation, Inheritance, Polymorphism, Difference between C++, and JAVA
Java Programming Fundamental: Structure of java program, Data types, Variables,
Operators, Keywords, Naming Convention, Decision Making (if, switch), Looping (for, while), Type Casting
Classes and Objects: Creating Classes and objects, Memory allocation for objects, Constructor, Implementation of Inheritance, Implementation of Polymorphism, Method Overloading, Method Overriding, Nested and Inner classes
Arrays and Strings: Arrays, Creating an array, Types of Arrays, String class Methods, String Buffer methods. Abstract Class, Interface, and Packages: Modifiers and Access Control, Abstract classes and methods, Interfaces, Packages Concept, Creating user defined packages
Exception Handling: Exception types, Using try catch and multiple catch, Nested try, throw, throws and finally, Creating User defined Exceptions.
File Handling: Byte Stream, Character Stream, File IO Basics, File Operations, creating file, reading file, Writing File
Applet Programming: Introduction, Types Applet, Applet Life cycle, Creating Applet, Applet tag

Semester – V (General)
Course Code: CMSGDSE02T/ Course Title: Discrete Structures

Core Course: Credit – 6, FM - 75

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Course Content

Introduction: Introduction to Sets, Finite and Infinite Sets, Unaccountably Infinite Sets. Introduction to Functions and relations, Properties of Binary relations, Closure, Partial Ordering Relations.

Unit-II: Pigeonhole Principle, Permutation and Combinations, Mathematical Induction, Principle of Inclusion and Exclusion.

Unit-III: Asymptotic Notations Recurrence Relations: Introduction, Generating Functions, Linear Recurrence Relations with constant coefficients and their solution.

Graphs Theory: Basic Terminology of Graphs, Models and Types, Multigraphs, Weighted Graphs, Graph Representation. Graph Isomorphism Graph Connectivity, Euler and Hamiltonian Paths and Circuits, Planar Graphs, Graph Coloring, Basic Terminology of Trees, Properties of Trees, Spanning Trees.

Inference Theory: Introduction, Logical Connectives, Well Formed Formulas, Tautologies, Equivalence

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Semester – VI (General)
Course Code: CMSGDSE03TCourse Title: Software Engineering.
Core Course: Credit – 6, FM - 75

Course Content

Software Process: Introduction, S/W Engineering Paradigm, life cycle models (water fall, incremental, spiral, evolutionary, prototyping, object oriented), System engineering, computer based system, verification, validation, life cycle process, development process, system engineering hierarchy.

Software requirements: Functional and non-functional, user, system, requirement Engineering process, feasibility studies, requirements, elicitation, validation, and management, software prototyping, prototyping in the software process, rapid prototyping techniques, user interface prototyping, S/W document. Analysis and modeling, data, functional and behavioral models, structured analysis, and data dictionary.

Design Concepts and Principles: Design process and concepts, modular design, Design heuristic, design model and document, Architectural design, software architecture, data design, architectural design, transform and transaction mapping, user interface design, user interface design principles. Real time systems, Real time software design, system design, real time executives, data acquisition system, monitoring and control system.

Software Configuration Management: The SCM process, Version control, Change control, Configuration audit, SCM standards.

Software Project Management: Measures and measurements, S/W complexity and Science measure, size measure, data and logic structure measure, information flow measure. Estimations for Software Projects, Empirical Estimation Models, Project Scheduling.

Testing: Taxonomy of software testing, levels, test activities, types of s/w test, black box Testing boundary conditions, structural testing, test coverage criteria based on data flow, mechanisms, regression testing, testing in the large. S/W testing strategies, strategic approach and issues, unit testing, integration testing, validation testing, system testing and debugging.

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Semester – VI (General)
Course Code: CMSGDSE04/ Course Title: Computer Networks.
Core Course: Credit – 6, FM - 75

Course Content

Basic concepts: Components of data communication, standards and organizations, Network Classification, Network Topologies; network protocol; layered network architecture; overview of OSI reference model; overview of TCP/IP protocol suite.

Physical Layer: Cabling, Network Interface Card, Transmission Media Devices- Repeater, Hub, Bridge, Switch, Router, Gateway.

Data Link Layer: Framing techniques; Error Control; Flow Control Protocols; Shared media protocols - CSMA/CD and CSMA/CA.

Network Layer: Virtual Circuits and Datagram approach, IP addressing methods – Subnetting; Routing Algorithms (adaptive and non-adaptive)

Transport Layer: Transport services, Transport Layer protocol of TCP and UDP

Application Layer: Application layer protocols and services – Domain name system, HTTP, WWW, telnet, FTP, SMTP

Network Security: Common Terms, Firewalls, Virtual Private Networks

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