NAHATA JNMS MAHAVIDYALAYA

North 24 Pgs. W.B.

Teaching Plan: 2022-23

Department: Computer Science Semester – I

Course Code: CMSGCOR01T **Course Title:** Problem Solving with Computer

Core Course: Credit – 4

Course Content	Teacher Name	Unit wise number of classes (in hours)	Teaching Days in a semester	REMARKS
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.	Arpita Chowdhury	3	56	
Planning the Computer Program: Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation.	Arpita Chowdhury	3		
Techniques of Problem Solving: Flowcharting, 4decision table, algorithms, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming.	Arpita Chowdhury	4		
Overview of Programming: Structure of a Python Program, Elements of Python	Arpita Chowdhury	4		
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).	Arpita Chowdhury	8		
Creating Python Programs: Input and Output Statements, Control statements (Looping while Loop, for Loop, Loop	Arpita Chowdhury	10		

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.	Arpita Chowdhury	10		
Introduction to Advanced Python: Objects and Classes, Inheritance, Regular Expressions, Event Driven Programming, GUI Programming.	Arpita Chowdhury	14		

Semester – II

Course Code: CMSGCOR02T **Course Title:** DBMS

Core Course: **Credit – 4**

Course Content	Teacher Name	Unit wise number of classes (in hours)	Teaching Days in a semester	REMARKS
Introduction to Database Management Systems: Characteristics of database approach, data models, DBMS architecture and data independence.	Arpita Chowdhury	10	60	**Direct Lecture**
Entity Relationship and Enhanced ER Modeling: Entity types, relationships, SQL- 99: Schema Definition, constraints, and object modeling.	Arpita Chowdhury	15		**Direct Lecture**
Relational Data Model: Basic concepts, relational constraints, relational algebra, SQL queries	Arpita Chowdhury	15		**Direct Lecture**
Database design: ER and EER to relational mapping, functional dependencies, normal forms up to third normal form.	Arpita Chowdhury	20		**Direct Lecture**

Semester – III

Course Code: CMSGCOR03T **Course Title:** DBMS

Core Course: **Credit – 4**

Course Content	Teacher Name	Unit wise number of classes (in hours)	Teaching Days in a semester	REMARKS
Introduction: System Software, Resource Abstraction, OS strategies.	Arpita Chowdhury	2	60	**Direct Lecture**
Types of operating systems - Multiprogramming, Batch, Time Sharing, Single user and Multiuser, Process Control & Real Time Systems.	Arpita Chowdhury	2		**Direct Lecture**
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.	Arpita Chowdhury	10		**Direct Lecture**
Process Management: System view of the process and resources, initiating the OS, process address space, process abstraction, resource abstraction, process hierarchy, Thread model	Arpita Chowdhury	15		**Direct Lecture**
Scheduling: Scheduling Mechanisms, Strategy selection, non-pre-emptive and pre-emptive, strategies.	Arpita Chowdhury	12		**Direct Lecture**
Memory Management: Mapping address space to memory space, memory allocation strategies, fixed partition, variable partition, paging, virtual memory	Arpita Chowdhury	12		**Direct Lecture**
Shell introduction and Shell Scripting	Arpita Chowdhury	7		**Direct Lecture**

Semester – IV

Course Code: CMSGCOR04T **Course Title:** Computer System Architecture

Core Course: Credit – 4

Course Content	Teacher Name	Unit wise number of classes (in hours)	Teaching Days in a semester	REMARKS
Introduction: Logic gates, Boolean algebra, combinational circuits, circuit simplification, flip-flops and sequential circuits, decoders, multiplexors, registers, counters and memory units.	Arpita Chowdhury	12	60	**Direct Lecture**
Data Representation and basic Computer Arithmetic: Number systems, complements, fixed and floating-point representation, character representation, addition, subtraction, magnitude comparison.	Arpita Chowdhury	8		**Direct Lecture**
Basic Computer Organization and Design: Computer registers, bus system, instruction set, timing and control, instruction cycle, memory reference, input-output and interrupt.	Arpita Chowdhury	18		**Direct Lecture**
Central Processing Unit: Register organization, arithmetic and logical micro-operations, stack organization, micro programmed control.	Arpita Chowdhury	10		**Direct Lecture**
Programming the Basic Computer: Instruction formats, addressing modes, instruction codes, machine language, assembly language, input output programming.	Arpita Chowdhury	8		**Direct Lecture**
Input-output Organization: Peripheral devices, I/O interface, Modes of data transfer, direct memory access.	Arpita Chowdhury	4		**Direct Lecture**

Semester – V

Course Code: CMSGDSE01T **Course Title:** Programming in JAVA

Core Course: Credit – 4

Course Content	Teacher Name	Unit wise number of classes (in hours)	Teaching Days in a semester	REMARKS
Introduction to Java: Features of Java, JDK Environment	Arpita Chowdhury	2	75	**Direct Lecture**
Object Oriented Programming Concept Overview of Programming, Paradigm, Classes, Abstraction, Encapsulation, Inheritance, Polymorphism, Difference between C++, and JAVA	Arpita Chowdhury	12		**Direct Lecture**
Java Programming Fundamental: Structure of java program, Data types, Variables, Operators, Keywords, Naming Convention, Decision Making (if, switch), Looping (for, while), Type Casting	Arpita Chowdhury	12		**Direct Lecture**
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	Arpita Chowdhury	12		**Direct Lecture**
Arrays and Strings: Arrays, Creating an array, Types of Arrays, String class Methods, String Buffer methods.	Arpita Chowdhury	8		**Direct Lecture**
Abstract Class, Interface, and Packages: Modifiers and Access Control, Abstract classes and methods, Interfaces, Packages Concept, Creating user defined packages	Arpita Chowdhury	10		**Direct Lecture**

Exception Handling: Exception types, Using try catch and multiple catch, Nested try, throw, throws and finally, Creating User defined Exceptions.	Arpita Chowdhury	6		**Direct Lecture**
File Handling: Byte Stream, Character Stream, File IO Basics, File Operations, creating file, reading file, Writing File	Arpita Chowdhury	6		**Direct Lecture**
Applet Programming: Introduction, Types Applet, Applet Life cycle, Creating Applet, Applet tag	Arpita Chowdhury	7		**Direct Lecture**

Course Code: CMSGDSE02T **Course Title:** Discrete Structures

Core Course: **Credit – 4**

Course Content	Teacher Name	Unit wise number of classes (in hours)	Teaching Days in a semester	REMARKS
Introduction: Introduction to Sets, Finite and Infinite Sets, Unaccountably Infinite Sets. Introduction to Functions and relations, Properties of Binary relations, Closure, Partial Ordering Relations.	Arpita Chowdhury	15	65	**Direct Lecture**
Unit-II: Pigeonhole Principle, Permutation and Combinations, Mathematical Induction, Principle of Inclusion and Exclusion.	Arpita Chowdhury	15		**Direct Lecture**
Unit-III: Asymptotic Notations	Arpita Chowdhury	5		**Direct Lecture**
Recurrence Relations: Introduction, Generating Functions, Linear Recurrence Relations with constant coefficients and their solution.	Arpita Chowdhury			**Direct Lecture**
Graphs Theory: Basic Terminology of Graphs, Models and Types, Multigraphs, Weighted Graphs, Graph Representation. Graph Isomorphism Graph Connectivity, Euler and	Arpita Chowdhury	15		**Direct Lecture**

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	Arpita Chowdhury	15		**Direct Lecture**

Semester – VI

Course Code: CMSGDSE03T **Course Title:** Software Engineering

Core Course: Credit – 6

Course Content	Teacher Name	Unit wise number of classes (in hours)	Teaching Days in a semester	REMARKS
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.	Arpita Chowdhury	10	75	**Direct Lecture**
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.	Arpita Chowdhury	12		**Direct Lecture**
Design Concepts and Principles: Design process and concepts, modular	Arpita Chowdhury	15		**Direct Lecture**

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.	Arpita Chowdhury	10		**Direct Lecture**
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.	Arpita Chowdhury	12		**Direct Lecture**
Testing: Taxonomy of software testing, levels, test activities, types of s/w test, black box testing 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.	Arpita Chowdhury	10		**Direct Lecture**
Trends in Software Engineering: Reverse Engineering and Re-engineering – wrappers – Case Study of CASE tools.	Arpita Chowdhury	6		**Direct Lecture**

Course Code: CMSGDSE04T **Course Title:** Computer Networks

Core Course: **Credit – 6**

Course Content	Teacher Name	Unit wise number of classes (in hours)	Teaching Days in a semester	REMARKS
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.	Arpita Chowdhury	20	75	**Direct Lecture**
Physical Layer: Cabling, Network Interface Card, Transmission Media Devices- Repeater, Hub, Bridge, Switch, Router, Gateway.	Arpita Chowdhury	8		**Direct Lecture**
Data Link Layer: Framing techniques; Error Control; Flow Control Protocols; Shared media protocols - CSMA/CD and CSMA/CA.	Arpita Chowdhury	10		**Direct Lecture**
Network Layer: Virtual Circuits and Datagram approach, IP addressing methods – Subnetting; Routing Algorithms (adaptive and non-adaptive)	Arpita Chowdhury	10		**Direct Lecture**
Transport Layer: Transport services, Transport Layer protocol of TCP and UDP	Arpita Chowdhury	8		**Direct Lecture**
Application Layer: Application layer protocols and services – Domain name system, HTTP, WWW, telnet, FTP, SMTP	Arpita Chowdhury	12		**Direct Lecture**
Network Security: Common Terms, Firewalls, Virtual Private Networks	Arpita Chowdhury	7		**Direct Lecture**

Skill Enhancement Courses

Course Code: CMSSSEC01M **Course Title:** Programming in Python

Core Course: **Credit – 2**

Course Content	Teacher Name	Unit wise number of classes (in hours)	Teaching Days in a semester	REMARKS
Planning the Computer Program: Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation.	Arpita Chowdhury	2	15	Direct Lecture
Techniques of Problem Solving: Flowcharting, decision table, algorithms, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming.	Arpita Chowdhury	2		Direct Lecture
Overview of Programming: Structure of a Python Program, Elements of Python	Arpita Chowdhury	3		Direct Lecture
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).	Arpita Chowdhury	4		Direct Lecture
Creating Python Programs: Input and Output Statements, Control statements (Branching, Looping, Conditional Statement, exit function, Difference between break, continue	Arpita Chowdhury	4		Direct Lecture

and pass.), Defining Functions, default arguments.				

Course Code: CMSSSEC02M **Course Title:** R Programming

Core Course: **Credit – 2**

Course Content	Teacher Name	Unit wise number of classes (in hours)	Teaching Days in a semester	REMARKS
Introduction: Overview and History of R, Getting Help, Data Types, Subsetting, Vectorized	Arpita Chowdhury	5	20	**Direct Lecture**
Operations, Reading and Writing Data.	Arpita Chowdhury	5		**Direct Lecture**
Control Structures, Functions, lapply, tapply, split, mapply, apply, Coding Standards.	Arpita Chowdhury	5		**Direct Lecture**
Scoping Rules, Debugging Tools, Simulation, R Profiler	Arpita Chowdhury	5		**Direct Lecture**