School of Sciences
Bachelor of Computer Science & Coding

SISTER NIVEDITA UNIVERSITY

SYLLABUS

FOR

THREE YEARS BACHELOR DEGREE COURSE
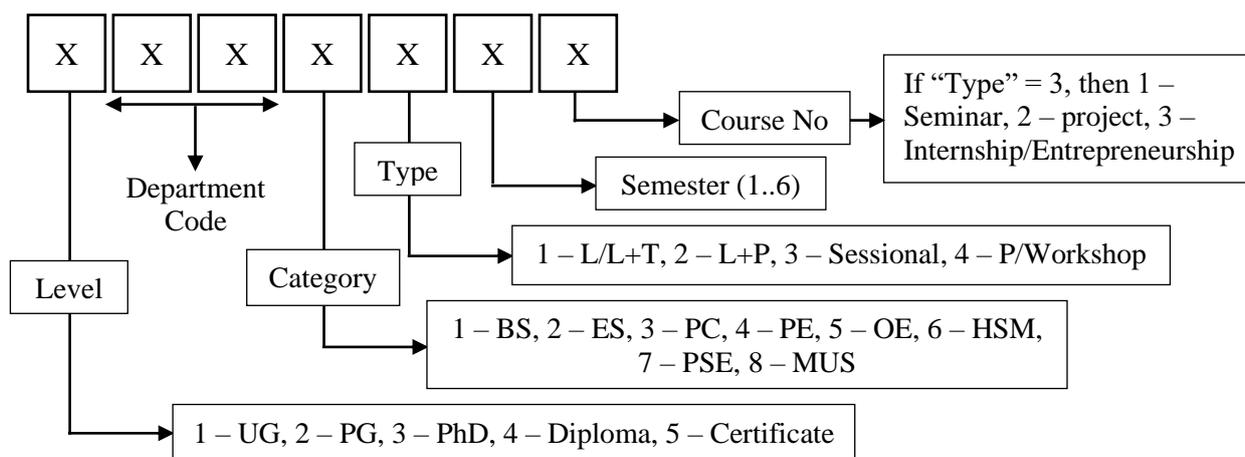
IN

COMPUTER SCIENCE & CODING

UNDER

UGC-CBCS SYSTEM

2022

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Credit Definition

Type	Duration (in Hour)	Credit
Lecture (L)	1	1
Tutorial (T)	1	1
Practical (P)	2	1

Subject Codification Nomenclature

CC: Core Courses; GE: General Elective; AECC: Ability Enhancement Compulsory Course; SEC: Skill Enhancement Courses; DSE: Discipline Specific Elective; USC: University specified course

First Year

Mandatory Induction Program – Duration 3 weeks

- Physical Activity
- Creative Arts
- Universal Human Values
- Literary
- Proficiency Modules
- Lectures by Eminent People
- Visits to Local Areas
- Familiarization to Department/Branch & Innovations

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SEMESTER: I

Category	Course Title	Code	Credit	Type		
				L	**T**	**P**
CC-1	Programming Concept with Python		6	3	1	4
CC-2	Digital Electronics		6	4	0	4
DSE-1	Calculus		4	3	1	0
GE-1	Generic Elective		4	3	1	0
AECC-1	Communicative English-I		2	2	0	0
USC-1	Foreign Language – I (German /Spanish /Japanese)		2	2	0	0
Total Credit			24			

SEMESTER: II

Category	Course Title	Code	Credit	Type		
				L	**T**	**P**
CC-3	Abstractions and Paradigms in Programming		4	3	1	0
CC-4	Data Structures with Python		6	4	0	4
DSE-2	Linear Algebra and Ordinary Differential Equations		4	3	1	0
GE-2	Generic Elective		4	3	1	0
SEC-1	Mentored Seminar – I		1	1	0	0
USC-2	Foreign Language – II (German /Spanish /Japanese)		2	2	0	0
Total Credit			21			

SEMESTER: III

Category	Course Title	Code	Credit	Type		
				L	**T**	**P**
CC-5	Introduction to Computational Thinking and Data Science with R Lab		6	4	0	4
CC-6	Operating System & Operating System Lab (UNIX)		6	3	1	4
DSE-3	Automata Theory and Logic		4	3	1	0
GE-3	Generic Elective		4	3	1	0
AECC-2	Environmental Science		2	2	0	0
SEC-2	Mentored Seminar – II		1	1	0	0
USC-3	Foreign Language – III (German /Spanish /Japanese)		2	2	0	0
Total Credit			25			

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SEMESTER: IV

Category	Course Title	Code	Credit	Type		
				L	T	P
CC-7	Computer Graphics & Multimedia		6	4	0	4
CC-8	Database and Information Systems		6	3	1	4
DSE-4	Numerical Analysis		4	4	0	0
GE-4	Generic Elective		4	3	1	0
SEC-3	Mentored Seminar – III		1	1	0	0
USC-4	Foreign Language – IV (German /Spanish /Japanese)		2	2	0	0
Total Credit			23			

SEMESTER: V

Category	Course Title	Code	Credit	Type		
				L	T	P
CC-9	Web Technology using PHP		6	4	0	4
CC-10	Introduction to Programming in Java		6	4	0	4
CC-11	Computer Networks		4	3	1	0
CC-12	Elective I		6	3	1	4
Total Credit			22			

SEMESTER:VI

Sl No	Course Title	Code	Credit	Type		
				L	T	P
1	Elective II		6	4	0	4
2	Elective III		6	4	0	4
3	Project Work I		13	0	0	26
Total Credit			25			

Elective I:
- React JS
- Android Programming
- Advanced Python Programming
- Advanced Java Programming

Elective II:
- Machine Learning
- Cryptography and Network Security
- Natural Language Processing
- AI & Neural Network

Elective III:
- Introduction to Wireless Networks
- Unix & Shell Programming

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- Design and Analysis of Algorithm
- Cloud Computing

SYLLABUS OUTLINE:

PAPER NAME: Programming Concept with Python

UNIT I: TOPICS	Introduction to Python -Installation and Working with Python Understanding Python Variables, Python basic Operators, Understanding python blocks
UNIT II: TOPICS	Python Data Types - Declaring and using Numeric data types: int, float, complex Using string data type and string operations Defining list and list slicing Use of Tuple data type
UNIT III: TOPICS	Python Program Flow Control -Conditional blocks using if, else and elif Simple for loops in python For loop using ranges, string, list and dictionaries Use of while loops in python Loop manipulation using pass, continue, break and else Programming using Python conditional and loops block
UNIT IV: TOPICS	Python Functions, Modules And Packages -Organizing python codes using functions Organizing python projects into modules Importing own module as well as external modules Understanding Packages Powerful Lamda function in python Programming using functions, modules and external packages
UNIT V: TOPICS	Python String, List And Dictionary Manipulations -Building blocks of python programs Understanding string in build methods List manipulation using in build methods Dictionary manipulation Programming using string, list and dictionary in build functions
UNIT VI: TOPICS	Python File Operation -Reading config files in python Writing log files in python Understanding read functions, read(), readline() and readlines() Understanding write functions, write() and writelines() Manipulating file pointer using seek Programming using file operations
UNIT VII: TOPICS	Python Object Oriented Programming – Oops Concept of class, object and instances Constructor, class attributes and destructors Real time use of class in live projects Inheritance , overlapping and overloading operators Adding and retrieving dynamic attributes of classes Programming using Oops support
UNIT VIII: TOPICS	Python Regular Expression -Powerful pattern matching and searching Power of pattern searching using regex in python Real time parsing of networking or system data using regex Password, email, url validation using regular expression Pattern finding programs using regular expression
UNIT IX: TOPICS	Python Exception Handling -Avoiding code break using exception handling Safe guarding file operation using exception handling Handling and helping developer with error code Programming using Exception handling
UNIT X: TOPICS	Python Database Interaction -SQL Database connection using python Creating and searching tables Reading and storing config information on database Programming using database connections

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PAPER NAME: Digital Electronics

UNIT I: TOPICS	Number Systems & Codes (6L) Decimal Number, Binary Number, Octal Number, Hexadecimal Number, Conversion – Decimal to Binary, Binary to Decimal, Octal to Binary, Binary to Octal, Hexadecimal to Binary, Binary to Hexadecimal, Octal to Binary to Hexadecimal, Hexadecimal to Binary to Octal; Floating Point Number Representation, Conversion of Floating Point Numbers, Binary Arithmetic, 1's and 2's Complement, 9's and 10's Complement, Complement Arithmetic, BCD, BCD addition, BCD subtraction, Weighted Binary codes, Non-weighted codes, Parity checker and generator, Alphanumeric codes
UNIT II: TOPICS	Logic Gates (2L) OR, AND, NOT, NAND, NOR, Exclusive – OR, Exclusive – NOR, Mixed logic
UNIT III: TOPICS	Boolean Algebra (4L) Boolean Logic Operations, Basic Law of Boolean Algebra, Demorgan's Theorem, Principle of Duality
UNIT IV: TOPICS	Minimization Techniques (5L) Sum of Products, Product of Sums, Karnaugh Map (up to 4 variables)
UNIT V: TOPICS	Multilevel Gate Network (3L) Implementation of Multilevel Gate Network, Conversion to NAND-NAND and NOR-NOR Gate Networks
UNITVI: TOPICS	Arithmetic Circuits (5L) Half Adder, Full Adder, Half Subtractor, Full Subtractor, Carry Look Ahead Adder, 4-Bit Parallel Adder
UNITVII: TOPICS	Combinational Circuits (5L) Basic 2-input and 4-input multiplexer, Demultiplexer, Basic binary decoder, BCD to binary converters, Binary to Gray code converters, Gray code to binary converters, Encoder
UNITVIII: TOPICS	Sequential Circuits (5L) Introduction to sequential circuit, Latch, SR Flip Flop, D Flip Flop, T Flip Flop, JK Flip Flop, Master Slave Flip Flop
UNITIX: TOPICS	Basics of Counters (2L) Asynchronous (Ripple or serial) counter, Synchronous (parallel) counter
UNIT X: TOPICS	Basics of Registers (3L) SISO, SIPO, PISO, PIPO, Universal Registers

Suggested Books:

1. Digital Circuit & Design, Salivahan,VIKAS
2. Digital Design, M. Morris. Mano & Michael D. Ciletti, PEARSON
3. Fundamentals of Digital Circuits; Anand Kumar; PHI
4. Digital Electronics; Tokheim; TMH
5. Digital Electronics; S. Rangnekar; ISTE/EXCEL

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PAPER NAME: Calculus

UNIT I: TOPICS	Limits, Evaluating Limits and the Squeeze Theorem including Three Special Limits, Continuity
UNIT II: TOPICS	Infinite Limits and Asymptotes, Tangent Lines and Derivatives
UNIT III: TOPICS	Velocity and Laws of Differentiation, Product and Quotient Rules
UNIT IV: TOPICS	Chain Rule, Implicit Differentiation
UNIT V: TOPICS	Extrema, Mean Value Theorem, Increasing/Decreasing Limits at infinity

Suggested Books:

SEMESTER: II

PAPER NAME: Abstractions and Paradigms in Programming

Course content	Importance of abstraction in programming. Abstractions supported by the major programming paradigms functional, imperative and object-oriented: Expressions, data and control abstractions, recursion, higher order functions, state and assignment, classes, objects, encapsulation and inheritance. Inductive reasoning of functional programs, loop invariants. Abstraction and its impact on efficiency. The course should be centered around programming examples and applications that demonstrate the importance of the abstractions mentioned.

Suggested Books:
1. Harold Abelson, Gerald Jay Sussman and Julie Sussman, Structure and Interpretation of Computer Programs, 2nd edition, The MIT Press, 1996.

PAPER NAME: Data Structure with Python

UNIT I: TOPICS	Introduction to Python (12L) Introduction to Python Python variables, expressions, statements: Variables,Keywords,Operators&operands,Expressions ,Statements, Orderof operations, String operations, Comments, Keyboard input, Example programs Functions: Type conversion function, Math functions, Composition of functions, Defining own function, parameters, arguments, Importing functions, Example programs
UNIT II: TOPICS	Conditions & Iterations (8L) Conditions: Modulus operator, Boolean expression, Logical operators, if, if-else, if-elif-else, Nested conditions, Example programs. Iteration: while, for, break, continue, Nested loop, Example programs

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UNIT III: TOPICS	Recursion, Strings, List, Dictionaries, Tuples Recursion:Python recursion, Examples of recursive functions, Recursion error, Advantages & disadvantages of recursion Strings:Accessing values in string, Updating strings, Slicing strings, String methods – upper(), find(), lower(), capitalize(), count(), join(), len(), isalnum(), isalpha(), isdigit(), islower(),isnumeric(), isspace(), isupper() max(), min(), replace(), split(), 2.5 Example programs List:Introduction, Traversal, Operations,Slice, Methods, Delete element, Difference between lists and strings. Dictionaries: Introduction, Brief idea of dictionaries & lists Tuples: Introduction, Brief idea of lists & tuples, Brief idea of dictionaries & tuples.
UNIT IV: TOPICS	Data Structure using Array (4L) Stack, queue, circular queue, priority queue, dequeue and their operations and applications.
UNIT V: TOPICS	Searching and Sorting (6L) Searching: linear search, Binary search, their comparison, Sorting: insertion sort, Selection sort.Quick sort, Bubble sort Heap sort, Comparison of sorting methods , Analysis of algorithm,complexity using big 'O' notation
UNIT VI: TOPICS	Linked List (4L) Linear link lists, doubly linked lists, stack using linked list, queue using linked list, circular linked listand their operations and applications.
UNIT VII: TOPICS	Trees (5L) Binary trees, binary search trees, representations and operations, thread representations, sequentialrepresentations, B tree , B+ tree,
UNIT VIII: TOPICS	Graphs (5L) Introduction to graphs, Definition, Terminology, Directed, Undirected & Weighted graph, Representation of graphs, Graph Traversal: Depth first search and Breadth first search. SpanningTrees, minimum spanning Tree, Shortest path algorithm
UNIT IX: TOPICS	Hashing (4L) Definition, Hashing functions, Load factor and collision, open addressing (linear probing) andchaining method to avoid collision

Suggested Books:

1. Data Structures and Algorithms in Python, Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser
2. Data Structures and Algorithmic Thinking with Python, NarasimhaKarumanchi
3. Python Data Structures and Algorithms: Benjamin Baka

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PAPER NAME: Linear Algebra and Ordinary Differential Equations

UNIT I (10 lectures)

Matrix Algebra- Introduction & definition, properties of matrix, special type of matrices, arithmetic of matrices, symmetric & skew-symmetric matrices, orthogonal matrices, singular and non-singular matrices with their properties, Trace of a matrix, Eigen value and Eigen vector computation, Inverse of a matrix and related properties, numerical problems solving.

UNIT II (10 lectures)

Differential Calculus: Review of limit, continuity and differentiability, L-Hospital rule, Leibnitz rule, successive differentiation, Rolle's theorem, Mean value theorem, Taylor series expansion, Function of several variables, Euler's theorem on homogeneous function, Partial differentiation, Jacobian, Maxima and Minimum of functions of one and two variables.

UNIT III (10 lectures)

Integral Calculus: Review of integration and definite integral. Differentiation under integral sign, double integral, change of order of integration, transformation of variables. Beta and Gamma functions: properties and relationship between them.

UNIT IV (10 lectures)

Differential Equations: Exact differential equations, integrating factors, change of variables, Total differential equations, Differential equations of first order and first degree, Differential equations of first order but not of first degree, Equations solvable for x, y, q, Equations of the first degree in x and y, Clairaut's equations. Higher Order Differential Equations: Linear differential equations of order n, Homogeneous and non-homogeneous linear differential equations of order n with constant coefficients.

SUGGESTED READING:

- Lay David C: Linear Algebra and its Applications, Addison Wesley, 2000.
- Schaum's Outlines: Linear Algebra, Tata McGraw-Hill Edition, 3rdEdition, 2006.
- Searle S.R: Matrix Algebra Useful for Statistics. John Wiley &Sons., 1982.
- Gorakh Prasad: Differential Calculus, PothishalaPvt. Ltd., Allahabad (14th Edition - 1997).
- Gorakh Prasad: Integral Calculus, PothishalaPvt. Ltd., Allahabad (14th Edition - 2000).
- David C. Lay: Linear Algebra and Its Applications, 3rdEdn, Pearson Education, Asia.

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SEMESTER: III

PAPER NAME: Introduction to Computational Thinking and Data Science with R Lab

UNIT I: TOPICS:	Introduction and Optimization Problems Optimization Problems Graph-theoretic Models
UNIT II: TOPICS:	Stochastic Thinking Random Walks
UNIT III: TOPICS	Monte Carlo Simulation Confidence Intervals
UNIT IV: TOPICS	Sampling and Standard Error Understanding Experimental Data
UNIT V: TOPICS	Introduction to Machine Learning Clustering Classification
UNIT VI: TOPICS	Classification and Statistical Sins

Suggested Books:

PAPER NAME: Operating System & System Programming

UNIT I: TOPICS	Introduction (3L) Importance of OS, Basic concepts and terminology, Types of OS, Different views, Journey of acommand execution, Design and implementation of OS
UNIT II: TOPICS	Process (10L) Concept and views, OS view of processes, OS services for process management, Scheduling algorithms, Performance evaluation; Inter-process communication and synchronization, Mutual exclusion, Semaphores, Hardware support for mutual exclusion, Queuing implementation of semaphores, Classical problem of concurrent programming, Critical region and conditional critical region, Monitors, Messages, Deadlocks
UNIT III: TOPICS	Storage Management (8L) Memory Management- Backward, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Segmentation with Paging.
UNIT IV: TOPICS	File-System Interface and Implementation (6L) File Concept, Access Methods, Directory Structure, Protection, File-System Structure, File-System Implementation, Directory Implementation; Allocation Methods, Free-Space Management.
UNIT V: TOPICS	Mass-Storage Structure (4L) Disk Structure; Disk Scheduling; Disk Management; Swap-Space Management
UNIT VI: TOPICS	Assemblers: Elements of Assembly Language Programming, Design of the Assembler, Assembler Design Criteria, Types of Assemblers, Two-Pass Assemblers, One-Pass Assemblers, Single pass Assembler for Intel x86 ,

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	Algorithm of Single Pass Assembler, Multi-Pass Assemblers
UNIT VII: TOPICS	Compilers: Causes of Large Semantic Gap, Binding and Binding Times, Data Structure used in Compiling, Scope Rules, Memory Allocation, Compilation of Expression, Compilation of Control Structure, Code Optimization

Suggested Books:

1. Operating Systems, Galvin, John Wiley
2. Operating Systems, Milankovic, TMH
3. An Introduction to Operating System, Bhatt,PHI
4. Modern Operating System, Tannenbaum,PHI
5. Guide to Operating Systems, Palmer, VIKAS
6. Operating Systems, Prasad, Scitech

PAPER NAME: Automata Theory and Logic

UNIT I: TOPICS	Logic, Math, and Machines: Ancient computational thinking (Euclid et al.) Finite automata Turing machines and the halting problem Oracles and computability Philosophical considerations
UNIT II: TOPICS	Computational Complexity: Decision trees and circuits Polynomial time and its justification Nontrivial examples of polynomial-time algorithms The concept of a reduction P, NP, and NP-completeness; the Cook-Levin Theorem The P versus NP problem and why it's hard
UNIT III: TOPICS	Randomness, Adversaries, and the Physical World: The power of probabilistic algorithms Private-key cryptography and one-way functions Public-key cryptography and trapdoor functions Pseudorandom number generators Does randomness really help? The P versus BPP question Zero-knowledge proofs Computational learning theory Quantum computing The ultimate physical limits of computation

Suggested Books:

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SEMESTER: IV

PAPER NAME: Computer Graphics & Multimedia

UNITI: TOPICS	Overview of Graphics Systems: Video Display Devices, Refresh Cathode Ray Tubes, Raster-Scan and Random-Scan Systems, Input Devices, Hard-Copy Devices and Graphics Software.
UNITII: TOPICS	Output Primitives: Points, Line Drawing Algorithms (DDA and Bresenham's Line Drawing Algorithm), Circle- Generating Algorithms (Bresenham's and Midpoint Circle Algorithms), Ellipse-Generating Algorithms(Midpoint Ellipse Algorithm only), Filled- Area Primitives: Scan –Line Polygon Fill Algorithm, Boundary-Fill Algorithm, Flood-Fill Algorithm.
UNITIII: TOPICS	Two Dimensional Geometric Transformations: Basic Transformations, Matrix Representations and Homogeneous Coordinates, Composite Transformations, Reflection and Shear, Transformations between Coordinates Systems, Raster Methods for Transformations.
UNITIV: TOPICS	Two-Dimensional Viewing: The Viewing Pipeline, Viewing Coordinate Reference Frame, Window-to-View Port Coordinate Transformation, Clipping- Point, Line(Cohan-0Sutherland Line Clipping and Liang –Barsky Line Clipping) and Polygon Clipping(Sutherland-Hodgeman Polygon Clipping).
UNITV: TOPICS	Multimedia Systems Design: Multimedia Elements, Multimedia Applications, Multimedia System Architecture, Evolving Technologies for Multimedia Systems, Multimedia Data Interface Standards, the Need for Data Compressions, Multimedia Database.
UNIT VI: TOPICS	Data & File Format Standards: Rich –Text Format, TIFF File Format, RIFF, MIDI File Format, JPEG DIB File Format, MPEG Standards.

Suggested Books:

1. D.Hearn& M. P. Baker -Computer Graphics C Version, 2nd Edition Pearson Education, New Delhi, 2006
2. J. F. KoegelBuferd -Multimedia Systems, Pearson Education, New Delhi, 2006
3. R.A. Plastock et.al. - Computer Graphics (Schaums Outline Series), 2nd Edition, TMH, New Delhi, 2006.
1. J.D.Foley- Computer Graphics, 2nd Edition, Pearson Education, New Delhi, 2004

PAPER NAME: Database & Information Systems

UNIT I: TOPICS	Database System Concepts & Architecture: Data Independence, Schemas, Instances, Database Languages, Database System Environments Data Models, Basic Structure of Oracle System, Storage

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	Organization in Oracle.
UNIT II: TOPICS	Data Modelling: Use of High –level Conceptual Data Models, ER Diagrams, Subclasses, Superclasses and Inheritance, Specialization & Generalization, Conceptual Object Modeling using UML ClassDiagrams, Knowledge Representation Concepts, Exercises.
UNIT III: TOPICS	Relational Data Model: Relational constraints, domain constraints, key constraints referential integrity Constraints, relational algebra, fundamental operations of relational algebra & theirImplementation, interdependence of operations, example queries.
UNIT IV: TOPICS	ER and EER to Relational Mapping: Mapping EER model concepts to relation, tuple relational calculus, domain relationalCalculus queries.
UNIT V: TOPICS	Database Design: Functional dependencies, irreducible sets of dependencies, loss less decomposition, 1st, 2nd& 3rd NF, dependency preservation, Boyce Codd NF, Multivalued Dependency & 4th NF, join Dependency & 5 NF, domain key normal form, restriction –union normal form,Denormalization.
UNIT VI: TOPICS	Query Processing And Optimization: SQLBasicQueries in SQL, Subqueries, Retrieving a Query Plan – Table Space Span & I/O, IndexScan, Equal Unique Index Lookup, Clustered vs. Non Clustered Indexing, Index Only Scan,Methods for Joining Tables –Nested Loop Join Merge Join, Hybrid Join, Multiple table Join,Transforming Nested Queries to Joins, Object Relational SQL, Procedural SQL, Introductionto Embedded SQL.
UNIT VII: TOPICS	Transaction: Schedules,Serializability, Precedence Graph, Concurrency Control Techniques,Implementation of Transaction in Programs, Cursors and Transaction, Dynamic SQL,Locking Levels of Isolation, Recovery, Checkpoints.

Suggested Books:

1. Fundamental of Database Systems- ElmasriNavathe- Pearson Education Asia
2. Database- Principles, Programming and Performance- Parick O' Neil Elizabeth O'Niel, Harcort Asia PTE Limited
3. An Introduction to Database Systems- C.J.Date, Addison Wesley, Pearson EducationPress
4. Database System Concepts- Abraham Silberschat, Henry F. Korth, S.Sudarshan, Tata McGraw Hill.

PAPER NAME: Numerical Analysis

Unit 1: Representation of numbers:

Round-off error, truncation error, significant error, error in numerical computation.

Unit 2: Solution of transcendental and algebraic equations:

Bisection, Regula-falsi, Fixed point, Newton Rephson.

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Unit 3: Interpolation:

Newton's forward, backward, Lagrange's and divided differences.

Unit 4: Numerical differentiation:

Methods based on interpolations.

Unit 5: Numerical Integration:

Trapezoidal, Simpson's 1/3 rd. rule.

Unit 6: Solution of linear equations:

Direct methods – Gauss elimination, LU decomposition, Iteration methods- Jacobi, Gauss-Seidel.

Unit 7: Ordinary differential equations:

Single step method - Euler method, Runge-Kutta Method, multistep method.

Unit 8: Approximations:

Least square polynomial approximation.

Reference Books:

1. A. Gupta and S.C. Bose: Introduction to Numerical Analysis, Academic Publisher 3rded, 2013

2. M.K. Jain, S.R.K.Iyenger and R.K. Jain: Numerical methods for scientific and Engineering Computations, New Age Internationals (P) Ltd, 1999.

SEMESTER: V

PAPER NAME: Web Technology using PHP

UNIT I: TOPICS	Introduction to Web Technology & implementation of PHP Programs: (4L) Evaluation of PHP. Basic Syntax. Defining variables and constants. PHP Data type Operator and Expression. Basics of HTML: Form Creation, Handling of Forms, Submission of Forms. POST& GET method.
UNIT II: TOPICS	Handling Html Form With PHP (4L) Capturing Form. Data Dealing with Multi-value files. Generating File uploaded form. Redirecting a form after submission.
UNIT III: TOPICS	Decisions, Functions, String, Array & Exception Handling (8L) Making Decisions. Doing Repetitive task with looping. Mixing Decisions and looping with Html What is a function? Cookies, Session and in-built functions. Creating and accessing String. Searching & Replacing String. Formatting String. String Related Library function. PHP Array. Creating index based and Associative array. Accessing array Element. Looping with Index based array. Looping with associative array using each() and foreach(). Some useful Library function. Understanding Exception and error. Try, catch, throw.

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UNIT IV: TOPICS	Database Connectivity with MySql (6L) Introduction to RDBMS. Connection with MySql Database. Performing basic database operation(DML) (Insert, Delete, Update, Select). Setting query parameter. Executing query Join (Cross joins, Inner joins, Outer Joins, Self joins.).
UNIT V: TOPICS	Java Script & JQuery (4L) Introduction to Javascript. Three ways to use Javascript. Working with events Client-side Validation. Introduction to JQuery. Validation using JQuery. JQuery Forms. JQuery Examples.
UNIT VI: TOPICS	Connecting Forms using AJAX Concept (4L) Introduction to AJAX. PHP with AJAX. Working with database.

Suggested Books:
- The Joy of PHP Programming: A Beginner's Guide to Programming Interactive Web Applications with PHP and MySQL. Alan Forbes, Fifth Edition, Plum Island • Beginning Web Programming, Jon Duckett, WROX
- Open Source for the Enterprise: Managing Risks, Reaping Rewards, Dan Woods and Gautam Guliani, O'Reilly, Shroff Publishers, and Distributors, 2005.
- Learning PHP, Ramesh Bangia, Khanna Publishing House

PAPER NAME: Programming with JAVA

UNITI: TOPICS	Java Evolution and Overview of Java Language: How Java differs from C and C++,Java and Internet, Java and World Wide Web, Introduction, Simple Java Program, More of Java, An Application with Two Classes, Java Program Structure, Java Tokens, Java Statements, Implementing a Java Program, Java Virtual Machine, Command Line Arguments, Programming Style.
UNITII: TOPICS	Constants, Variables, and Data Types: Introduction, Constants, Variables, Data Types,Declaration of Variables, Giving Values of Variables, Scope of Variables, Symbolic Constants, Type Casting, Getting Values of Variables, Standard Default Values.
UNITIII: TOPICS	Operators and Expressions: Introduction, Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators, Special Operators, Arithmetic Expressions, Evolution of Expressions, Precedence of Arithmetic Operators, Type Conversion in Expressions, Operator Precedence and Associativity, Mathematical Functions.
UNITIV: TOPICS	Decision Making and Branching: Introduction, Decision Making with if Statement, Simpleif Statement, The if... else Statement, Nesting of if ... else Statements, The else if Ladder, The switch Statement, The ?: Operator.
UNITV: TOPICS	Decision Making and Looping: Introduction, The while Statement, The do Statement,The for Statement, Jumps in Loops, Labelled Loops.
UNITVI: TOPICS	Classes, Objects and Methods: Introduction, Defining a Class, Adding Variables, AddingMethods, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static

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	Members, Nesting of Methods, Inheritance: Extending a. Class, Overriding Methods, final Variables and Methods, Final Classes, Finalizer Methods, Abstract Methods and Classes, Visibility Control.
UNITVII: TOPICS	Arrays, String and Vectors: Arrays, One-Dimensional Arrays, Creating an Array, Two-Dimensional Arrays, Strings, Vectors, Wrapper Classes.
UNITVIII: TOPICS	Interfaces: Multiple Inheritance: Introduction, Defining Interfaces, Extending Interfaces,implementing Interfaces, Accessing Interface Variables.
UNITIX: TOPICS	Packages: Putting Classes Together: Introduction, Java API Packages, Using systemPackages, Naming Conventions, Creating Packages, Accessing a Packages, Using a Package, Adding a Class to a Package, Hiding Classes.
UNITX: TOPICS	Multithreaded Programming: Introduction, Creating Threads, Extending the ThreadClass, Stopping and Blocking a Thread, Life Cycle of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, and Synchronization.
UNITXI: TOPICS	Managing Errors and Exceptions: Introduction, Types of Errors, Exceptions, Syntax ofException Handling Code, Multiple Catch Statements, Using finally Statement, Throwing Our Own Exceptions, Using Exceptions for Debugging.
UNITXII: TOPICS	Applet Programming: Introduction, How Applets Differ from Application, Preparing toWrite Applets, Building Applet Code, Applet Life Cycle, Creating an Executable Applet, Designing a Web Page, Applet Tag, Adding Applet to HTML File, Running the Applet, More About Applet Tag, Passing Parameters to Applets.

Suggested Books:

1. Let Us JAVA 2 Edition, YashavantKanetkar, BPB Publications
2. Programming with JAVA 5th Edition, E Balagurusamy, TMH
3. Java - The Complete Reference, Herbert Schildt

PAPER NAME: Computer Networks

UNITI: TOPICS	Data Transmission Basic Concepts and Terminology: Data Communication Model,Communication Tasks, Parallel & Serial Transmission, Transmission Models, Transmission Channel, Data Rate, Bandwidth Signal Encoding Schemes, Data Compression, Transmission Impairments, Layering and Design Issues, OSI Model, Services and Standards.
UNITII: TOPICS	Computer Network: Network Topology, Performance of Network, Network Classification, Advantages & Disadvantages of Network, Transmission Media (guided and unguided), Network Architecture, OSI Reference Model, TCP/IP, SNA and DNA.

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UNITIII: TOPICS	Data Line Devices: Modems, DSL, ADSL, Multiplexer and Different MultiplexingTechniques: (FDM, TDM).
UNITIV: TOPICS	Data Link Layer: Need for Data Link Control, Frame Design Consideration, Flow Control &Error Control (Flow control mechanism, Error Detection and Correction techniques) Data Link Layer Protocol, HDLC.
UNITV: TOPICS	Network Layer: Routing, Congestion control, Internetworking principles, InternetProtocols (IPv4 packet format, Hierarchal addressing sub netting, ARP, PPP), Bridges, Routers.
UNITVI: TOPICS	Physical Layer: Function and interface, physical layer standard, null modem.
UNITVII: TOPICS	Local Area Network: Definition of LAN, LAN topologies, Layered architecture of LAN, MAC, IEEE standard. Ethernet LAN, CSMA, CSMA/ CD, Token passing LAN.
UNITVIII: TOPICS	Network Security: Security Requirement, Data encryption strategies, authenticationprotocols, Firewalls.
UNITIX: TOPICS	Basic Applications: Telnet, FTP, NFS, SMTP, SNMP and HTTP.

Suggested Books:

1. B. Fourauzan, "Data Communications and Networking", 4th Edition, Tata McGraw-Hill
2. William Stallings- Data & Communications, 6th Edition, Pearson Education
3. Tanenbaum- Computer Networks, 3rd Edition, PHI, New Delhi.

SEMESTER: VI

SYLLABUS OUTLINE:

Elective III(B): UNIX and Shell Programming

UNIT I: TOPICS	Introduction to UNIX Operating System (8L) 1. Introduction to UNIX UNIX operating system, UNIX architecture: Kernel and Shell, Files and Processes, System calls, Features of UNIX, POSIX and single user specification, Internal and external commands 2. Utilities of UNIX Calendar (cal), Display system date (date), Message display (echo), Calculator (bc), Password changing (password), Knowing who are logged in (who), System information using uname, File name of terminal connected to the standard input (tty) 3. UNIX file system File system, Types of file, File naming convention, Parent – Child relationship, HOME variable, inode number, Absolute pathname, Relative pathname,

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	Significance of dot (.) and dotdot (..), Displaying pathname of the current directory (pwd), Changing the current directory (cd), Make directory (mkdir), Remove directories (rmdir), Listing contents of directory (ls), Very brief idea aboutimportant file systems of UNIX: /bin, /usr/bin, /sbin, /usr/sbin, /etc, /dev, /lib, /usr/lib, /usr/include, /usr/share/man, /temp, /var, /home
UNIT II: TOPICS	Files (8L) 1. Ordinary file handling Displaying and creating files (cat), Copying a file (cp), Deleting a file (rm), Renaming/ moving a file (mv), Paging output (more), Printing a file (lp), Knowing file type (file), Line, word and character counting (wc), Comparing files (cmp), Finding common between two files (comm), Displaying file differences (diff), Creating archive file (tar), Compress file (gzip), Uncompress file (gunzip), Archive file (zip), Extract compress file (unzip), Brief idea about effect of cp, rm and mv command on directory 2. File attributes File and directory attributes listing and very brief idea about the attributes, File ownership, File permissions, Changing file permissions – relative permission & absolute permission, Changing file ownership, Changing group ownership, File system and inodes, Hard link, Soft link, Significance of file attribute for directory, Default permissions of file and directory and using umask, Listing of modification and access time, Time stamp changing (touch), File locating (find)
UNIT Ⅲ: TOPICS	Shell and Process (8L) 1. Shell Interpretive cycle of shell, Types of shell, Pattern matching, Escaping, Quoting, Redirection, Standard input, Standard output, Standard error, /dev/null and /dev/tty, Pipe, tee, Command substitution, Shell variables 2. Process Basic idea about UNIX process, Display process attributes (ps), Display System processes, Process creation cycle, Shell creation steps (init ->getty -> login -> shell), Process state, Zombie state, Background jobs (& operator, nohup command), Reduce priority (nice), Using signals to kill process, Sending job to background (bg) and foreground (fg), Listing jobs (jobs), Suspend job, Kill a job, Execute at specified time (at and batch)
UNIT IV: TOPICS	Customization and Filters (8L) 1. Customization Use of environment variables, Some common environment variables (HOME, PATH, LOGNAME, USER, TERM, PWD, PS1, PS2), Aliases, Brief idea of command history 2. Filters Prepare file for printing (pr), Custom display of file using head and tail, Vertical division of file (cut), Paste files (paste), Sort file (sort), Finding repetition and non- repetition (uniq), Manipulating characters using tr, Searching pattern using grep, Brief idea of using Basic Regular Expression (BRE), Extended Regular Expression (ERE), and egrep, grep –E
UNIT V: TOPICS	Shell script & System Administration (8L) 1. Introduction to shell script Simple shell scripts, Interactive shell script, Using command line arguments, Logical operator (&&, ||), Condition checking (if, case), Expression evaluation (test, []), Computation (expr), Using expr for

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	strings, Loop (while, for), Use of positional parameters 2. System Administration Essential duties of UNIX system administrator, Starting and shutdown, Brief idea about user account management (username, password, home directory, group id, disk quota, terminal etc.)

Suggested Books:

1. UNIX-Concepts & Applications, Sumitava Das, TMH
2. Learning UNIX Operating System, Peek, SPD/O'REILLY
3. Understanding UNIX, Srirengan, PHI
4. Essentials Systems Administration, Frisch, SPD/O'REILLY

PAPER NAME: Project – I