# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

## Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B.Tech Computer Science and Engineering-Mobile Applications-Apple Authorized Training Center

SEMESTER-IV(2024-2028)

| COURSE CODE | CATEGORY | COURSE NAME | TEACHING & EVALUATION SCHEME | | | | | L | T | P | CREDITS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | THEORY | | | PRACTICAL | | | | | |
| | | | END SEM University Exam | Two Term Exam | Teachers Assessment* | END SEM University Exam | Teachers Assessment* | | | | |
| ML307 | BS | Environmental Management and Sustainability | 60 | 20 | 20 | 0 | 0 | 4 | 0 | 0 | 4 |

**Legends**: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

## COURSE OBJECTIVES:

The student will have ability to:

1. To create awareness towards various environmental problems.
2. To create awareness among students towards issues of sustainable development.
3. To expose students towards environment friendly practices of organizations.
4. To sensitize students to act responsibly towards environment

## COURSE OUTCOMES:

Upon completion of the subject, students will be able to:

1. The course will give students an overview of various environmental concerns and practical challenges in environmental management and sustainability.
2. Emphasis is given to make students practice environment friendly behavior in day-to-day activities.

## SYLLABUS

### UNIT I — 10 HOURS

**Introduction to Environment Pollution and Control:**

1. Pollution and its types (Air, Water, and Soil): Causes, Effects and Control measures
2. Municipal Solid Waste: Definition, Composition, Effects
3. Electronic Waste: Definition, Composition, Effects
4. Plastic Pollution: Causes, Effects and Control Measures

### UNIT II — HOURS

**Climate Change and Environmental Challenges:**

1. Global Warming and Green House Effect
2. Depletion of the Ozone Layer
3. Acid Rain
4. Nuclear Hazards

### UNIT III — 9 HOURS

**Environmental Management and Sustainable Development:**

1. Environmental Management and Sustainable Development: An overview
2. Sustainable Development Goals (17 SDGs)
3. Significance of Sustainable Development
4. Environment Friendly Practices At Workplace and Home (Three Rs' of Waste Management, Water Conservation, Energy Conservation)

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## UNIT IV 8 HOURS

**Environmental Acts**:

1. The Water (Prevention and Control of Pollution) Act, 1974: Objectives, Definition of Pollution under this act, Powers and Functions of Boards
2. The Air (Prevention and Control of Pollution) Act, 1981:Objectives, Definition of Pollution under this act, Powers and Functions of Boards
3. The Environment (Protection) Act, 1986: Objectives, Definition of important terms used in this Act, Details about the act.
4. Environmental Impact Assessment: Concept and Benefits.

## UNIT V 7 HOURS

**Role of Individuals, Corporate and Society:**

1. Environmental Values
2. Positive and Adverse Impact of Technological Developments on Society and Environment
3. Role of an individual/ Corporate/ Society in environmental conservation
4. Case Studies: The Bhopal Gas Tragedy, New Delhi's Air Pollution, Arsenic Pollution in Ground Water (West Bengal), Narmada Valley Project, Cauvery Water Dispute, Fukushima Daiichi Disaster (Japan), Ozone Hole over Antarctica, Ganga Pollution, Deterioration of TajMahal. Uttarakhand flash floods.

## TEXTBOOKS:

1. Rogers, P.P., Jalal, K.F., Boyd, I.A. *An Introduction to Sustainable Development*, Earthscan.
2. Kalam, A.P.J., *Target 3 Billon: Innovative Solutions Towards Sustainable Development*, Penguin Books

## REFERENCE:

1. Kaushik A. and Kaushik, *Perspectives in Environmental Studies*, New Delhi: New Age International Publishers.
2. Dhameja, S.K., *Environmental Studies*, S.K. Kataria and Sons, New Delhi
3. Bharucha E., *Environmental Studies for Undergraduate Courses*, New
4. Delhi: University Grants Commission.
5. Wright R.T., *Environmental Science: towards a sustainable future*, New Delhi: PHL Learning Private Ltd.
6. Rajagopalan R., *Environmental Studies*, New York: Oxford University Press.

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| BTCS401N | DCC | Data Base Management Systems | 60 | 20 | 20 | 30 | 20 | 3 | 0 | 2 | 4 |

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## COURSE OBJECTIVES:

The student will have ability to:

1. To differentiate among the various database system according to their function.
2. To understand the process to develop database model and database design.
3. To understand managing a database using Structured Query Language.
4. To expand an understanding of necessary DBMS concepts such as: Database Transactions, Database Security, Integrity, Concurrency.
5. To understand and build a straightforward database system and show competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

## COURSE OUTCOMES:

Upon completion of the subject, students will be able to:

1. Construct conceptual data models by identifying the entities and relationships.
2. Evaluate the normality of a logical data model, and correct any anomalies.
3. Develop physical data models for relational database management systems.
4. Implement relational databases using a RDBMS.
5. Work as a valuable member of a database design and implementation team.

## SYLLABUS

### UNIT I — 10 HOURS

**Introduction:** Concept & Overview of DBMS, Three Schema Architecture of DBMS, Database Approach v/s Traditional File Accessing Approach, Advantages of Database Systems, Data Models, Schema and Instances, Data Independence, Data Base Language and Interfaces, Functions of DBA and Designer, Database Users.

**Entity-Relationship Model:** Basic concepts, Design Issues, Mapping Constraints, Keys, Entity- Relationship Diagram, Weak Entity Sets and Extended E-R features. ER Diagram to Relational Table conversion.

### UNIT II — 9 HOURS

**Relational Model:** Structure of Relational Databases, Relational Algebra, Relational Calculus, Extended Relational Algebra Operations, Joins and its type. Integrity Constraints. Referential Integrity, Intension and Extension.

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### UNIT III — 8 HOURS

**SQL and PL/SQL:** SQL commands, Set operations, Aggregate Functions, Null Values, Domain Constraints, Assertions, Views, Nested Sub Queries, Stored Procedures and Triggers, Database Security, Application development using PLSQL.

**Relational Database Design:** Functional Dependency, Database Anomalies, Normalization and its forms, Multi-Valued Dependencies, 4NF, Join Dependency, 5NF.

### UNIT IV — 7 HOURS

**Transaction and Concurrency Control:** Physical Data Structures, Query Optimization, Transaction Model properties, State Serializability, Concurrency control protocols, Multiple Granularities, Granularity of Data Item. Multi version schemes, Database Recovery Methods, Recovery in Multi-Database System and Database Backup and Recovery from Catastrophic Failure.

### UNIT V — 8 HOURS

**File Organization and Index Structure:** File & Record Concept, Placing file records on Disk, Types of Records, Types of Single-Level Index, Multilevel Indexes, Dynamic Multilevel Indexes using B tree and B+ tree. Mongo DB, NoSQL types, Features and tools.

### TEXTBOOKS:


1. Henry F. Korth and Silberschatz Abraham, *Database System Concepts*, Mc.GrawHill, 6th Ed., 2015.
2. Raghu Ramakrishnan and Johannes Gehrke, *Database Management Systems*, McGraw- Hill Education, 2003.


### REFERENCE:


1. Kahate, Atul, *Introduction to Database Management Systems*, Pearson Education India, 2006.
2. C J Date, *An Introduction to Database System*, Pearson Educations, 8th Edition, 2004.
3. Ivan Bayross, *SQL, PL/SQL - The Programming Language of Oracle*, BPB Publications 4th Revised Edition, 2010.
4. Elmasri, Navathe, *Fundamentals of Database Systems*, Pearson Educations 7th Edition, 2016.
5. Seema Kedar, *Database Management System*, Technical Publications, 2009.
6. Rajiv Chopra, *Database Management System (DBMS) A Practical Approach*, Kindle Edition, S Chand (December 1, 2010), 2017.

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## LIST OF PRACTICALS

1. Design a Database and create required tables. For e.g. Bank, College Database.
2. Apply the constraints like Primary Key, Foreign key, NOT NULL to the tables.
3. Write a SQL statement for table and record handling like implementing INSERT statement, using SELECT and INSERT together, DELETE, UPDATE, TRUNCATE statements and DROP, ALTER statements.
4. Write the queries for Retrieving Data from a Database Using the WHERE clause, using Logical Operators in the WHERE clause , Using IN, BETWEEN, LIKE, ORDER BY, GROUP BY and HAVING Clause, Using Aggregate Functions and Combining Tables Using JOINS.
5. Write the query for implementing the following functions: MAX (), MIN (), AVG (), COUNT ().
6. Write the query to implement the concept of Integrity constrains.
7. Write the query to create the views.
8. Perform the queries for triggers.
9. Perform the following operation for demonstrating the insertion, updating and deletion using the referential integrity constraints.
10. Write the query for creating the users and their role. Using GRANT and REVOKE operations.
11. Develop a small application for a patient admitted in a hospital which has capability of inserting, deleting, updating, and the patient record. The application should also be able to search the patient's record by its id.

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| BTCS302N | DCC | Analysis & Design of Algorithms | 60 | 20 | 20 | 30 | 20 | 3 | 0 | 2 | 4 |

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## COURSE OBJECTIVES:

The student will have ability to:

1. To learn the algorithm analysis techniques.
2. To critically analyze the efficiency of alternative algorithmic solutions for the same problem
3. To understand the limitation of algorithm power.
4. To understand different algorithm design techniques.

## COURSE OUTCOMES:

Upon completion of the subject, students will be able to:

1. Define the basic concepts of algorithms and analyze the performance of algorithms.
2. Explain different standard algorithm design techniques, namely, divide & conquer, greedy, dynamic programming, backtracking and branch & bound.
3. Demonstrate standard algorithms for fundamental problems in Computer Science.
4. Design algorithms for a given problem using standard algorithm design techniques.
5. Analyze and compare the efficiency of various algorithms of a given problem.
6. Identify the limitations of algorithms in problem solving.
7. To identify the types of problem, formulate, analyze and compare the efficiency of algorithms.

## SYLLABUS

### UNIT I — 10 HOURS

**Algorithms Designing:** Algorithms, Analyzing Algorithms, Asymptotic Notations, Heap Sort, Sorting and Searching Algorithms and their Analysis in terms of Space and Time Complexity.

**Divide and Conquer:** General Method, Binary Search, Merge Sort, Quick Sort, Selection Sort, Strassen's Matrix Multiplication Algorithms.

### UNIT II — 9 HOURS

**Greedy Method:** General Method, fractional Knapsack Problem, Job Sequencing with Deadlines, Minimum-Cost Spanning Tree - Prim's and Kruskal's algorithm, Single Source Shortest Paths.

### UNIT III — 8 HOURS

**Dynamic Programming:** General Method, Optimal Binary Search Trees, O/1 Knapsack, multistage graph, Traveling Salesperson Problem, All Pairs Shortest Paths.

### UNIT IV — 7 HOURS

**Backtracking:** General Method, 8-Queens Problem, Graph Coloring, Hamiltonian Cycles, sum of Subsets.

Branch and Bound: General Method, O/1 Knapsack Problem, Traveling Salesperson Problem.

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## UNIT V 8 HOURS

**NP Hard and NP Complete Problems:** Basic Concepts, Cook's Theorem, NP Hard Graph and NP Scheduling Problems, Some Simplified NP Hard Problems.

## TEXTBOOKS:

1. Ellis Horowitz and Sartaj Sahni, *Fundamental of Computer Algorithms*, 2nd Edition, Galgotia Publication, 2001.
2. Thomas H Cormen, Charles E Leiserson and Ronald L Rivest, *Introduction to Algorithms*, 3rd Ed., MIT Press. 2009.

## REFERENCE:

1. Donal E Knuth, *Fundamentals of Algorithms: The Art of Computer Programming*, Vol l, 3rd Ed., Pearson Education, 1997.
2. Goodman, S.E. & Hedetnieni, *Introduction to Design and Analysis of Algorithm*, Tata McGraw Hill, 1977.
3. S. Dasgupta, C. H. Papadimitriou, and U. V. Vazirani, *Algorithms*, Tata McGraw Hill, 2006.
4. J.E Hopcroft, J.D Ullman, *Design and analysis of algorithms*, TMH Publication.

## LIST OF PRACTICALS

1. Write a program for Iterative and Recursive Binary Search.
2. Write a program for Merge Sort.
3. Write a program for Quick Sort.
4. Write a program for Strassen's Matrix Multiplication.
5. Write a program for minimum spanning trees using Kruskal's algorithm.
6. Write a program for minimum spanning trees using Prim's algorithm.
7. Write a program for single sources shortest path algorithm.
8. Write a program for Floyd-Warshal algorithm.
9. Write a program for traveling salesman problem.
10. Write a program for Hamiltonian cycle problem.

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| BTDSE421M | DSE | Computer Graphics and Multimedia | 60 | 20 | 20 | 30 | 20 | 2 | 0 | 2 | 3 |

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## COURSE OBJECTIVES:

The student will have ability to:

1. Understood basic concepts of computer graphics.
2. Extract the various computer graphics hardware and display technologies.
3. Evaluate various algorithms for scan conversion and filling of basic objects and their comparative analysis.
4. Acquire knowledge about drawing basic shapes such as lines, circle, ellipse, Polygon.
5. Remembering knowledge about two- and three-dimensional transformations.
6. Analyze the line and polygon clipping algorithms of the basic shapes.
7. Understood the various Multimedia Operation and file formats.

## COURSE OUTCOMES:

Upon completion of the subject, students will be able to:

1. Apply basic concepts of computer graphics.
2. Able to perform processing of basic shapes by various processing algorithms /techniques.
3. Design two and three-dimensional graphics.
4. Analyze all the types of clipping algorithms for line and polygon.
5. Apply the acquire knowledge about Visible Surface Detection methods, Illumination Models and Surface Rendering.
6. Able to perform various types of color model implication.
7. Acquire knowledge to apply advanced techniques such as fractals, introduction to open GL and Multimedia Systems.

## SYLLABUS

### UNIT I — 9 HOURS

Introduction to Computer Graphics, Applications of computer graphics, Display devices, Random and Raster scan systems, CRT color monitors, Beam Penetration CRT, The Shadow - Mask CRT, DVST, Graphics input devices, Graphics software and standards.

### UNIT II — 10 HOURS

Points and Lines, DDA line drawing algorithm, Bresenham's drawing algorithm, Mid-point Circle drawing algorithm, Mid-point circle drawing algorithm, Mid-point Ellipse drawing algorithm, Parametric Cubic Curves: - Bezier and B-Spline curves, Filled Area Primitives: -Scan line polygon fill algorithm, Pattern fill algorithm Inside-Outside Tests, Boundary fill algorithms, Flood fill algorithms.

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## UNIT III — 10 HOURS

**2D transformation:** Translation, Rotation, Scaling, Shearing, Reflection. Inverse Transformation, Homogenous coordinate system, Matrices Transformation, Composite Transformation.

**3D transformations:** translation, rotation, Scaling. Parallel & Perspective Projection, Types of Parallel & Perspective Projection. Composite transformations Projections, Back Surface detection method Depth Buffer method Scan line method BSP tree method, Area Subdivision method.

## UNIT IV — 8 HOURS

**Windowing & Clipping:** World Coordinate System, Screen Coordinate System, Viewing Transformation, Line Clipping, Cohen Sutherland, Midpoint Line clipping algorithms, Polygon Clipping: Sutherland –Hodgeman, Weiler-Atherton algorithms. Basic Illumination Model, Diffuse reflection, Specular reflection, Phong Shading Gourand shading, ray tracing, color models like RGB, YIQ, CMY, HSV.

## UNIT V — 9 HOURS

**Multimedia System:** An Introduction, Multimedia hardware, Multimedia System Architecture. Data & File Format standards, i.e. RTF, TIFF, MIDI, JPEG, DIB, MPEG, Audio: digital audio, MIDI, processing sound, sampling, compression. Video: Avi, 3GP, MOV, MPEG, compression standards, compression through spatial and temporal redundancy. Multimedia Authoring.

## TEXTBOOKS:

1. John F. Hughes, Andries Van Dam, Morgan McGuire, David F. Sklar, James D. Foley, Steven K. Feiner and Kurt Akeley, *Computer Graphics: Principles and Practice*, 3rd Edition, Addison- Wesley Professional, 2013.
2. *Computer Graphics*, C Version, 2e Paperback – 2002

## REFERENCE:

1. Foley, Vandam, Feiner, Huges, *Computer Graphics: Principles & Practice*, second Ed., Pearson Education, 2003.
2. Judith Jeffcoate, *Multimedia in practice technology and Applications*, PHI, 1998.
3. David F Rogers, *Procedural elements for Computer Graphics*, Tata McGraw Hill, Second Ed.
4. Foley, VanDam, Feiner and Hughes, *Computer Graphics Principles & Practice in C*, Second Ed., Pearson Education.
5. David Hillmaa, *Multimedia Technology & Applications*, Delmar, 1998.
6. Donald Hearn and Pauline Baker M, *Computer Graphics*, Prentice Hall, New Delhi, 2007.

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## LIST OF PRACTICALS

1. Implement DDA Line Drawing algorithm.
2. Implement Bresenham's line drawing algorithm.
3. Implement Mid-Point circle drawing algorithm.
4. Implement Mid-Point ellipse drawing algorithm.
5. Implement cubic Bezier curve.
6. Implement a menu-driven program for 2D transformations.
7. Implement Line clipping algorithm using Cohen-Sutherland.
8. Implement Polygon Clipping using Sutherland Hodgeman.
9. Implement Scan line fill algorithm.
10. Study of Multimedia and Program for Flash.

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| BTDSE422M | DSE | Principles of Distributed Systems | 60 | 20 | 20 | 30 | 20 | 2 | 0 | 2 | 3 |

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## COURSE OBJECTIVES:

The student will have ability to:

1. Observe the principles, architectures, algorithms and programming models used in distributed system.
2. Analyze state-of-the-art distributed system, such as Google File System.
3. Model and implement sample distributed system.
4. Summarize the functionality of Distributed System.

## COURSE OUTCOMES:

Upon completion of the subject, students will be able to:

1. Understand architecture and communication systems in Distributed Systems.
2. Understand synchronization and various election algorithms in Distributed Systems.
3. Discuss different Distributed File System.
4. Evaluate Distributed Shared Memory.
5. Analyze various consistency and replication protocols and methods.
6. Understand various types of Distributed Systems.
7. Determine performance evaluation of various types of Distributed System.

## SYLLABUS

### UNIT I — 10 HOURS

**Characterization of Distributed System:** Introduction, Examples of Distributed Systems, Resource Sharing and the Web, Challenges.

**System Models:** Introduction, Architectural Models, Fundamental Models.

### UNIT II — 9 HOURS

**Time and Global States:** Introduction, Clocks Events and Process States, Synchronizing Physical Clocks, Logical Time and Logical Clocks, Global States, Distributed Debugging.

**Coordination and Agreement:** Introduction, Distributed Mutual Exclusion, Elections, Multicast Communication, Consensus and Related Problems.

### UNIT III — 8 HOURS

**Inter Process Communication:** Introduction, the API for the Internet Protocols, External Data Representation and Marshalling, Client-Server Communication

**Distributed Computing Paradigms**: Basic Message Passing Model – The Client Server, Message Passing, RPC basics, RPC implementation, RPC communication and issues, Remote Procedure Call Model – RPC in conventional languages and in Java - The Distributed Objects – The Collaborative Application.

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## UNIT IV 7 HOURS

**Distributed File Systems:** File system, DFS- definition, Characteristics, Goals, File Service Architecture.
**Name Services:** Introduction, Name Services and the Domain Name System, Directory Services, Case Study of the Global Name Services.
**Distributed Shared Memory:** Introduction, Design and Implementation Issues, Sequential Consistency, Release Consistency, Other Consistency Models.

## UNIT V 8 HOURS

**Transactions and Concurrency Control:** Introduction, Transactions, Nested Transactions, Locks, Optimistic Concurrency Control, Timestamp Ordering, Comparison of Methods for Concurrency Control.
**Distributed Transactions:** Introduction, Flat and Nested Distributed Transactions, Atomic Commit Protocols, Concurrency Control in Distributed Transactions, Distributed Deadlocks, Transaction Recovery.

## TEXTBOOKS:

1. Andrew S. Tanenbaum, Maarten Van Steen, *Distributed Systems, Principles and Paradigms*, 3rd Edition 2017, PHI.
2. George Coulouris, J Dollimore and Tim Kindberg, *Distributed Systems, Concepts and Design*, Pearson Education, 5th Edition. 2017.

## REFERENCE:

1. Sukumar Ghosh, Hapman & Hall/CRC, *Distributed Systems, An Algorithm Approach*, Taylor & Fransis Group, 2014.
2. P. K. Sinha, *Distributed Operating Systems: Concepts and Design*, IEEE press 3rd Edition, 2009
3. M. Singhal and N. G. Shivaratri, *Advanced Concepts in Operating Systems*, McGraw-Hill, 2011.

## LIST OF PRACTICALS

1. Implement concurrent echo client-server application.
2. Implement concurrent day-time client-server application.
3. Incrementing a counter in shared memory.
4. Create CORBA based server-client application.
5. Configuring reliability and security options. Monitor SOAP request and response packets.
6. Analyze parts of it and compare them with the operations (java functions) headers.
7. Design XML Schema and XML instance document.

# ShriVaishnavVidyapeethVishwavidyalaya, Indore

## ShriVaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B.Tech Computer Science and Engineering-Mobile Applications-Apple Authorized Training Center

SEMESTER-IV(2024-2028)

| COURSE CODE | CATEGORY | COURSE NAME | TEACHING & EVALUATION SCHEME | | | | | L | T | P | CREDITS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | THEORY | | | PRACTICAL | | | | | |
| | | | END SEM University Exam | Two Term Exam | Teachers Assessment* | END SEM University Exam | Teachers Assessment* | | | | |
| BTDSE423M | DSE | Information Storage and Management | 60 | 20 | 20 | 30 | 20 | 2 | 0 | 2 | 3 |

**Legends**: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

## COURSE OBJECTIVES:

The student will have ability to:

1. An ability to understand various storage architecture & technologies.
2. An ability to understand various technologies used to provide backup & recovery.
3. An ability to understand various techniques used to provide security.
4. Ability to identify information storage system requirements.
5. An ability to develop policy for information storage system.
6. An ability to develop policy for backup& recovery.

## COURSE OUTCOMES:

Upon completion of the subject, students will be able to:

1. Describe & apply storage technologies.
2. Identify storage technologies that provide cost effective IT solution for medium to large scale businesses & data centers.
3. Manage Virtual Server & Storage between Remote locations.
4. Design analysis and manage clusters of resources.

## SYLLABUS

### UNIT I — 10 HOURS

**Introduction:** Digital data and its types, Information storage, Key characteristics of data center, Evolution of computing platforms. Introduction to storage technology: Data Proliferation, evolution of various storage technologies, Overview of storage infrastructure components, Information life Cycle Management, Data categorization.

### UNIT II — 9 HOURS

**Storage System Architecture:** Intelligent disk subsystems overview, Contrast of integrands modular array, Component Architecture of Intelligent disk subsystems, Disk physical structure components, properties, performance, and specifications, RAID levels & parity algorithms, hot sparing, Front end to host storage provisioning, mapping and operation.

### UNIT III — 8 HOURS

**Introduction to network storage:** JBOD, DAS, NAS, SAN & CAS evolution and comparison, Applications, Elements, Connectivity, standards, management, security and limitations of DAS, NAS, CAS & SAN.

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## UNIT IV 7 HOURS

**Hybrid storage solutions and virtualization:** memory, network, server, storage & appliances. Data center concepts & requirements, Backup and disaster recovery. Industry Management standards, standard framework applications, Key management metrics.

## UNIT V 8 HOURS

**Information storage on clouds:** concept of cloud, cloud computing, storage on cloud, Cloud benefits, Cloud computing evolution. Application & services on cloud, cloud service providers, cloud deployment models, Essential characteristics of cloud computing.

## TEXTBOOKS:

1. G. Somasundaram & Alok Shrivastava editors, *ISM: Storing, Managing, and Protecting Digital Information*, Wiley India
2. Saurabh, *Cloud Computing: Insight into New era Infrastructure*, Wiley India.

## REFERENCE:

1. Ulf Troppens, Wolfgang Mueller-Friedt, Rainer Erkens, Rainer Wolafka, Nils Haustein, *Storage Network explained: Basic and application of fiber channels, SAN, NAS, ISESI, INFINIBAND and FCOE*, Wiley India.
2. Sosinsky, *Cloud Computing Bible*, Wiley India.

## LIST OF PRACTICALS

1. Understand working of different storage devices.
2. Perform different steps for data backup and recovery.
3. Analyze of various techniques to provide security to data.
4. Understand different policies for information storage and management.
5. Demonstrate how to manage Virtual Server and Storage between remote locations.
6. Understand physical structure and components of hard disc.
7. Analyze how information storage on cloud is performed.

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SEMESTER-IV(2024-2028)

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| BTCSMO B401N | SEC | Mobile App Development IV -Android | -- | -- | -- | 30 | 20 | 0 | 0 | 2 | 1 |

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## COURSE OBJECTIVES:

The student will have ability to:

1. To describe the basic tools and techniques to develop an Android application.
2. To illustrate the fundamental concepts of application development for Android with Java.
3. To design the user interface (UI) and user's interaction for Android application.

## COURSE OUTCOMES:

Upon completion of the subject, students will be able to:

1. Define key programming terms relevant to Android.
2. Describe the process of creating an Android application.
3. Demonstrate programming best practices in Android.
4. Program mobile applications for the Android operating system that use basic and advanced phone features.
5. Select the appropriate UI, user interactions, to develop the working Android application from the concept.

## SYLLABUS

### UNIT I

**Introduction:** Android overview, features, history and versions, API levels, Installation of Android Studio, configuring Android studio and Create Virtual Device, Dalvik Virtual Machine.

### UNIT II

**Getting Started:** Android Resources, Activities, Activity Life Cycle, Services, Intent, Types of Intent, layouts, Building a basic app , Android Studio folder structure and Useful files ,Edit code , Creating an Android Virtual Device, Run the app in the emulator.

### UNIT III

**Android Widget:** UI Widgets , Working with Button class and methods ,Button with Listener, Toast ,Toast Class and methods, Custom Toast, Toggle Button, Toggle Button Class and methods, checkbox class and methods, custom Checkbox, Radio Button, Radio Group, Dynamic Radio Button ,Custom Radio Button, Alert Dialogs class and methods, Spinner.

### UNIT IV

**Advanced Widget:** Auto Complete Text View, List View Rating Bar, Web View, Seek Bar, Date Picker, Time Picker analog and Digital ,Progress Bar, Scroll View Vertical and Horizontal, Image Switcher, Image Slider, Tab Layout , Tab layout with Frame Layout, Search View, Search View on Toolbar , Edit Text with Text Watcher.

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| BTCSMO B401N | SEC | Mobile App Development IV -Android | -- | -- | -- | 30 | 20 | 0 | 0 | 2 | 1 |

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## UNIT V

**Android Storage and SQLite:** Storage Preferences, Internal Storage and External Storage. SQLite: SQLite Open Helper class and methods, SQLite Database class and methods.

## TEXTBOOKS:

1. Android Programming: The Big Nerd Ranch Guide (Big Nerd Ranch Guides)
2. Android User Interface Design: Turning Ideas and Sketches into Beautifully Designed Apps

## REFERENCE:

1. http://www.tutorialspoint.com/android/
2. http://www.programiz.com/android
3. Head First Android Development: Dawn Griffiths, 2015, O′Reilly

## LIST OF PRACTICALS

1. Create a Hello world App.
2. Create an App Using Labels and Buttons.
3. Create an Calculator App using Text views , Labels and Buttons to perform different mathematical operations (using action listener).
4. Create an App to demonstrate Lifecycle of an App.
5. Create an App to demonstrate Image Viewer.
6. Create an App to demonstrate Toast.
7. Create an App to demonstrate Checkbox.
8. Create an App to demonstrate Radio button.
9. Create an App to demonstrate Alert Dialog.
10. Create an App to demonstrate Autocomplete Text view.
11. Create an App to demonstrate List view.
12. Create an App Using Date picker and Time picker.
13. Create an App Using Constraints.
14. Create different apps for each Layout.
15. Create an app to demonstrate search view.
16. Create an App to demonstrate database connectivity using SQLite.