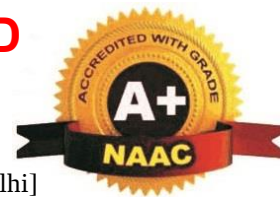




VIGNAN'S INSTITUTE OF MANAGEMENT AND TECHNOLOGY FOR WOMEN

(An Autonomous Institution)

[Sponsored by Lavu Educational Society, Affiliated to JNTUH & Approved by AICTE, New Delhi]
Kondapur (V), Ghatkesar (M), Medchal - Malkajgiri (D) - 501 301. Phone: 96529 10002/3



VR25ITCS

VMTW

B.Tech.in INFORMATION TECHNOLOGY COURSE STRUCTURE – VR25

II B. Tech - II Semester

S. No	Course Code	Course	L	T	P	Credits
1	25CS401PC	Discrete Mathematics	3	0	0	3
2	25CS402PC	Data Communications and Computer Networks	3	0	0	3
3	25CS403PC	Database Management Systems	3	0	0	3
4	25CS404PC	Formal Languages and Automata Theory	3	0	0	3
5	25IT405PC	Web Programming	3	0	0	3
6	25MS406BS	Innovation and Entrepreneurship	2	0	0	2
7	25CS407PC	Database Management Systems Lab	0	0	2	1
8	25CS408PC	Computer Networks Lab	0	0	2	1
9	25IT409PC	Web Programming Lab	0	0	2	1
10	25ML410SD	Node JS/React JS/ Django, UI Design-Flutter	0	0	2	1
11	25MS411BS	Indian Knowledge System	1	0	0	1
		Total	18	0	08	22

Note: L-Theory

T-Tutorial

P-Practical

C-Credits

B. Tech.

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DISCRETE MATHEMATICS**Course Objectives:**

- Introduces elementary discrete mathematics for computer science and engineering.
- Topics include formal logic notation, methods of proof, induction, sets, relations, algebraic structures, elementary graph theory, permutations and combinations, counting principles; recurrence relations and generating functions.

Course Outcomes:

- Understand and construct precise mathematical proofs
- Apply logic and set theory to formulate precise statements
- Analyze and solve counting problems on finite and discrete structures
- Describe and manipulate sequences
- Apply graph theory in solving computing problems

UNIT-I

Mathematical logic: Introduction, Statements and Notation, Connectives, Normal Forms, Theory of Inference for the Statement Calculus, The Predicate Calculus, Inference Theory of the Predicate Calculus.

UNIT-II

Set theory: Introduction, Basic Concepts of Set Theory, Representation of Discrete Structures, Relations and Ordering, Functions.

UNIT-III

Algebraic Structures: Introduction, Algebraic Systems, Semi groups and Monoids, Lattices as Partially Ordered Sets, Boolean Algebra.

UNIT-IV

Elementary Combinatorics: Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with Repetitions, Enumerating Permutation with Constrained Repetitions, Binomial Coefficient, The Binomial and Multinomial Theorems, The Principle of Exclusion.

UNIT-V

Graph Theory: Basic Concepts, Isomorphism and Sub graphs, Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multi-graphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four-Color Problem.

TEXTBOOKS:

1. Discrete Mathematical Structures with Applications to Computer Science: J.P. Tremblay, R. Manohar, McGraw-Hill, 1st ed.
2. Discrete Mathematics for Computer Scientists & Mathematicians: Joel Mott, Abraham Kandel, Theodore P. Baker, Prentis Hall of India, 2nd ed.

REFERENCEBOOKS:

1. Discrete and Combinatorial Mathematics – an applied introduction: Ralph. P. Grimald, Pearson education, 5th edition.
2. Discrete Mathematical Structures: Thomas Kosy, Tata Mc Graw Hill Publishing co.

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DATA COMMUNICATIONS AND COMPUTER NETWORKS

Course Objectives:

- Explore basic concepts of data communication
- Introduce students to TCP/IP and OSI models along with their merits and demerits.
- Explore in detail services offered by various layers of OSI Model.
- Understand link layer protocols, UDP, TCP and application layer protocols.

Course Outcomes:

- Understand and explore the basics of communication and computer networks
- Understand data link, network and transport layers concepts of a computer network.
- Understand the working of application layer protocols.

UNIT-I

Data Communications: Components Direction of Data flow Networks

Components and Categories— Types of Connections Topologies—Protocols and Standards— ISO/ OSI model, Example Networks such as ATM, Frame Relay, ISDN

Physical layer: Transmission modes, Multiplexing, Transmission Media, Switching, Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks.

UNIT-II

Data link layer: Introduction, Framing, and Error– Detection and Correction– Parity– LRC– CRC Hamming code, Flow and Error Control, Noiseless Channels, Noisy Channels, HDLC, Point to Point Protocols.111 Medium Access sub layer: ALOHA, CSMA/CD, LAN–EthernetIEEE802.3,IEEE802.5 – IEEE 802.11, Random access, Controlled access, Channelization.

UNIT-III

Network layer: Logical Addressing, Internetworking, Tunneling, Address mapping, ICMP, IGMP, Forwarding, Uni-Cast Routing Protocols, Multicast Routing Protocols.

UNIT-IV

Transport Layer: Process to Process Delivery, UDP and TCP protocols, Data Traffic, Congestion, Congestion Control, QoS, Integrated Services, Differentiated Services, QoS in Switched Networks.

UNIT-V

Application Layer: Domain name space, DNS in Internet, Electronic Mail, SMTP, FTP, WWW, HTTP, SNMP.

TEXTBOOKS:

1. Data Communications and Networking, Behrouz A. Forouzan, Fourth Edition TMH.

REFERENCEBOOKS:

1. Computer Networks, Andrew S Tanenbaum, 6th Edition. Pearson Education.
2. Computer Networking: A Top-Down Approach Featuring the Internet. James F.Kurose & Keith W. Ross, 3rd Edition, Pearson Education
3. Data communications and Computer Networks, P. C Gupta, PHI.
4. An Engineering Approach to Computer Networks, S. Keshav, 2nd Edition, Pearson Education.

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DATABASE MANAGEMENT SYSTEMS**Prerequisites:** A course on “Data Structures”.**Course Objectives:**

- To understand the basic concepts and the applications of database systems. 2. To master the basics of SQL and construct queries using SQL.
- Topics include data models, database design, relational model, relational algebra, transaction control, concurrency control, storage structures and access techniques.
- **Course Outcomes:**
- Gain knowledge of fundamentals of DBMS, database design and normal forms 2. Master the basics of SQL for retrieval and management of data.
- Be acquainted with the basics of transaction processing and concurrency control. 4. Familiarity with database storage structures and access techniques

UNIT-I

Database System Applications: A Historical Perspective, File Systems versus a DBMS, the Data Model, Levels of Abstraction in a DBMS, Data Independence, Structure of a DBMS **Introduction to Database Design:** Database Design and ER Diagrams, Entities, Attributes, and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design With the ER Model

UNIT-II

Introduction to the Relational Model: Integrity constraint over relations, enforcing integrity constraints, querying relational data, logical database design, introduction to views, destroying/altering tables and views. Relational Algebra, Tuple relational Calculus, Domain relational calculus.

UNIT-III

SQL: QUERIES, CONSTRAINTS, TRIGGERS: form of basic SQL query, UNION, INTERSECT, and EXCEPT, Nested Queries, aggregation operators, NULL values, complex integrity constraints in SQL, triggers and active databases.

Schema Refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join decomposition, multivalued dependencies, FOURTH normal form, FIFTH normal form.

UNIT-IV

Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability, Lock Based Protocols, Timestamp Based Protocols, Validation- Based Protocols, Multiple Granularity, Recovery and Atomicity, Log-Based Recovery, Recovery with Concurrent Transactions.

UNIT-V

Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and

Secondary Indexes, Index data Structures, Hash Based Indexing, Tree based Indexing, Comparison of File Organizations, Indexes- Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.

TEXTBOOKS:

1. Database System Concepts, Silberschatz, Korth, Mc Graw hill, V edition. 3rd Edition
2. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill

REFERENCEBOOKS:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elma sri Navrate, Pearson Education
3. Introduction to Database Systems, C. J. Date, Pearson Education
4. Oracle for Professionals, The X Team, S. Shahand V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition

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FORMAL LANGUAGES AND AUTOMATA THEORY**Pre requisites:** Mathematical Foundations **Course Objectives**

- To provide introduction to some of the central ideas of theoretical computer science from the perspective of formal languages.
- To introduce the fundamental concepts of formal languages, grammars and automata theory. 3. Classify machines by their power to recognize languages.
- Employ finite state machines to solve problems in computing.
- To understand deterministic and non-deterministic machines.
- To understand the differences between decidability and undecidability.

Course Outcomes

- Understand the concept of abstract machines and their power to recognize the languages. 2. Employ finite state machines for modeling and solving computing problems.
- Design context free grammars for formal languages. 4. Distinguish between decidability and undecidability.

UNIT-I

Introduction to Finite Automata: Structural Representations, Automata and Complexity, the Central Concepts of Automata Theory–Alphabets, Strings, Languages, Problems. **Nondeterministic Finite Automata:** Formal Definition, an application, Text Search, Finite Automata with Epsilon-Transitions.

Deterministic Finite Automata: Definition of DFA, How A DFA Process Strings, The language of DFA, Conversion of NFA with ϵ -transitions to NFA without ϵ -transitions. Conversion of NFA to DFA, Moore and Melay machines

UNIT-II

Regular Expressions: Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic Laws for Regular Expressions, Conversion of Finite Automata to Regular Expressions.

Pumping Lemma for Regular Languages, Statement of the pumping lemma, Applications of the Pumping Lemma.

Closure Properties of Regular Languages: Closure properties of Regular languages, Decision Properties of Regular Languages, Equivalence and Minimization of Automata.

UNIT-III

Context-Free Grammars: Definition of Context-Free Grammars, Derivations Using a Grammar, Leftmost and Rightmost Derivations, the Language of a Grammar, Sentential Forms, Parse Tree, Applications of Context-Free Grammars, Ambiguity in Grammars and Languages.

Push Down Automata: Definition of the Push down Automata, the Languages of a PDA,

Equivalence of PDA's and CFG's, Acceptance by final state, Acceptance by empty stack, Deterministic Pushdown Automata. From CFG to PDA, From PDA to CFG.

UNIT-IV

Normal Forms for Context-Free Grammars: Eliminating useless symbols, Eliminating ϵ -Productions. Chomsky Normal form Greibach Normal form.

Pumping Lemma for Context-Free Languages: Statement of pumping lemma, Applications **Closure Properties of Context-Free Languages:** Closure properties of CFL's, Decision Properties of CFL's Turing Machines: Introduction to Turing Machine, Formal Description, Instantaneous description, The language of a Turing machine

UNIT-V

Types of Turing machine: Turing machines and halting

Undecidability: Undecidability, A Language that is Not Recursively Enumerable, An Undecidable Problem that is RE, Undecidable Problems about Turing Machines, Recursive languages, Properties of recursive languages, Post's Correspondence Problem, Modified Post Correspondence problem, Other Undecidable Problems, Counter machines.

TEXTBOOKS:

1. Introduction to Automata Theory, Languages, and Computation, 3rd Edition, John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, Pearson Education.
2. Theory of Computer Science Automata languages and computation, Mishra and Chandra sekaran, 2nd edition, PHI.

REFERENCEBOOKS:

1. Introduction to Languages and The Theory of Computation, John C Martin, TMH.
2. Introduction to Computer Theory, Daniel I. A. Cohen, John Wiley.
3. A Textbook on Automata Theory, P. K. Srimani, Nasir S. F. B, Cambridge University Press.
4. Introduction to the Theory of Computation, Michael Sipser, 3rd edition, Cengage Learning.
5. Introduction to Formal languages Automata Theory and Computation Kamala Krithivasan, Rama R, Pearson.

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WEB PROGRAMMING**Course Objectives:**

- Learn web design using HTML, CSS, and Java Script.
- Understand PHP for server-side scripting and databases. 3. Explore XML structure and parsing techniques.
- Study servlets, applets, and user interface components. 5. Use Word Press and Joomla for CMS development.

Course Outcomes:

- Build responsive web pages using HTML and CSS.
- Write PHP scripts for form handling and storage.
- Validate and parse XML with DTD and schemas.
- Implement servlets and applets with session management.
- Develop websites using CMS tools like Word Press.

UNIT-I

HTML- Basic Tags-List, Tables, Images, Forms, Frames, **Cascading Style Sheets (CSS)**– syntax, selectors, properties

JAVA Script- Webpage Designing using HTML, Scripting basics- Client side and server-side scripting. Java Script Object, names, literals, operators and expressions- statements and features- events - windows- documents- frames- data types- built-in functions-Browser object model-Verifying forms- HTML5- CSS3- HTML 5 canvas - Web site creation using tools.

UNIT-II

Introduction to PHP: Declaring variables, data types, arrays, strings, operators, expressions, control structures, functions, reading data from web form controls like text boxes, radio buttons, lists etc., Handling File Uploads. Connecting to database (My SQL as reference), executing simple queries, handling results, Handling sessions and cookies File Handling in **PHP:** File operations like opening, closing, reading, writing, appending, deleting etc. on text and binary files, listing directories.

UNIT-III

XML: Introduction to XML, Defining XML tags, their attributes and values, Document Type Definition, XML Schemes, Document Object Model, XHTML Parsing XML Data– DOM and SAX Parsers in java. **JDBC:** JDBC Overview–JDBC implementation–Connection class– Statements–Catching Database.

UNIT-IV

APPLETS: Java applets- Life cycle of an applet Adding images to an applet Adding sound to an applet. Passing parameters to an applet. Event Handling. Introducing AWT: Working with Windows Graphics and Text. Using AWT Controls, Layout Managers and Menus. Servlet– life cycle of a servlet. The Servlet API, Handling HTTP Request and Response, using Cookies, Session Tracking. Introduction to JSP.

UNIT-V**Database Handling and Content Management System**

PHP Database Interface - Web Hosting - Content Management System - Case Study of CMS-using Word Press, Joomla- The content structure– Templates- Menu links–

Components- Modules- Text editors Permissions

TEXTBOOKS:

1. Harvey Deitel, Abbey Deitel, Internet and World Wide Web: How To Program 5th Edition.

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INNOVATION AND ENTREPRENEURSHIP

(Common for IT, CSE(AIML), CSE(DS))

Course Objectives:

- To familiarize on the basic concepts of innovation, entrepreneurship and its importance.
- To Identify and analyze the process of problem-opportunity identification, market segmentation, and idea generation techniques.
- To initiate prototype development and understand minimum viable product.
- To develop initial Business and financial planning and Go-to-Market strategies
- To impart knowledge on establishing startups ,venture pitching and IPR

Course Outcomes:

- Understand the entrepreneurship and the entrepreneurial process and its significance in economic development.
- Assess the problem from an industry perspective and generate solutions using the design thinking principles.
- Assess market competition, estimate market size, and develop a prototype.
- Analyze Business and financial planning models and Go-to-Market strategies.
- Able to build a start-up, register IP and identify funding opportunities.

Unit I: Fundamentals of Innovation and Entrepreneurship

Innovation: Introduction, need for innovation, Features, Types of innovations, innovations in manufacturing and service sectors, fostering a culture of innovation, planning for innovation. Entrepreneurship: Introduction, types of entrepreneurship attributes, mindset of entrepreneurial and intrapreneurial leadership, Role of entrepreneurs in economic development. Woman Entrepreneurship, Importance of on-campus startups. Understanding to build entrepreneurial mindset, attributes and networks individuals while on campus. Core Teaching Tool: Simulation, Game, Industry Case Studies (Personalized for students 16 industries to choose from), VentureActivity.

Unit II: Problem and Customer Identification

Identification of gap, problem, analyzing the problem from a industry perspective, real-world problems, market and customer segmentation, validation of customer problem fit, Iterating problem-customer fit, Competition and Industry trends mapping and assessing initial opportunity, Porter's Five Force Model. Idea generation, Ideation techniques: Brainstorming, Brain writing, Round robin, and SCAMPER, Design thinking principles, Mapping of solution to problem.

Core Teaching Tool: Several types of activities including: Class, game, GenAI, 'Get out of the Building' and Venture Activity.

Unit III: Opportunity assessment and Prototype development

Identify and map global competitors, review industry trends, and understand market sizing: TAM, SAM, and SOM. Assessing scope and potential scale for the opportunity. Understanding prototyping and Minimum Viable Product(MVP).

Developing a prototype: Testing, and validation.

Core Teaching Tool: Venture Activity, no-code Innovation tools, Class activity

Unit IV: Business & Financial Models

Introduction to— Business Model and types, Lean Canvas Approach: 9-block lean canvas model, building lean canvas for your startup. Business planning: components of Business plan- Sales plan, People plan and financial plan, Financial Planning: Types of costs, preparing a financial plan for profitability using a financial template, understanding the basics of Unit economics, Economies of Scale and analyzing financial performance. Go-To-Market (GTM) approach Selecting the Right Channel, Creating digital presence, and building customer acquisition strategy.

Core Teaching Tool: Founder Case Studies– Sama and Securely Share; Class activity and discussions; Venture Activities.

Unit V: Startups and IPR

Startup requirements, building founding team members and mentors, pitch preparation, start-up registration process, funding opportunities and schemes, institutional support to entrepreneurs, startup lifecycle, documentation, legal aspects in startup, venture pitching readiness, National Innovation Startup Policy (NISP) and its features.

Patents, Designs, Patentability, Procedure for grants of patents. Indian Scenario of Patenting, International Scenario: International cooperation on Intellectual Property. Patent Rights:

Scope of Patent Rights. Copyright, trademark, and GI. Licensing and transfer of technology.

Core Teaching Tool: Expert talks; Cases; Class activity and discussions; Venture Activities.

Suggested Readings:

1. John R Bessant, Joe Tidd, Innovation and Entrepreneurship, 4E, Wiley, Latest Edition.
2. Ajay Batra, The Startup Launch Book-A Practical Guide for Launching Customer Centric Ventures, Wiley, 2020. (For Core Teaching Tool).
3. Entrepreneurship Development and Small Business Enterprises, Poornima M Charantimath, 3E, Pearson, 2018.
4. D. F. Kuratko and T. V. Rao, Entrepreneurship: A South-Asian Perspective, Cengage Learning, 2013.
5. Robert D. Hisrich, Michael P. Peters, Dean A. Shepherd, Sabyasachi Sinha (2020). Entrepreneurship, McGraw Hill, 11th Edition.
6. NISP-[Brochure inside pages- startup policy 2019.pdf](#)

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DATABASE MANAGEMENT SYSTEMS LAB
(Common for CSE, IT)**Course Objectives:**

- Introduce ER data model, database design and normalization
- Learn SQL basics for data definition and data manipulation

Course Outcomes:

- Design database schema for a given application and apply normalization
- Acquire skills in using SQL commands for data definition and data manipulation.
- Develop solutions for database applications using procedures, cursors and triggers

List of Experiments:

1. Concept design with E-R Model
2. Relational Model
3. Normalization
4. Practicing DDL commands
5. Practicing DML commands
6. A) Querying (using ANY, ALL, UNION, INTERSECT, JOIN, Constraints etc.) B) Nested, Correlated sub queries
7. Queries using Aggregate functions, GROUPBY, HAVING and Creation and dropping of Views.
8. Triggers(Creation of insert trigger, delete trigger, update trigger)
9. Procedures
10. Usage of Cursors

TEXT BOOKS:

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata McGraw Hill, 3rd Edition
2. Database System Concepts, Silberschatz, Korth, McGrawHill, V edition.

REFERENCES BOOKS:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate, Pearson Education
3. Introduction to Database Systems, C. J. Date, Pearson Education
4. Oracle for Professionals, The X Team, S. Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
6. Fundamentals of Database Management Systems, M.L.Gillenson, Wiley Student Edition.

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COMPUTER NETWORKS LAB
(Common for CSE, IT, CSE(AIML), CSE(DS))**Course Objectives:**

- To understand the working principle of various communication protocols.
- To understand the network simulator environment and visualize a network topology and observe its performance
- To analyze the traffic flow and the contents of protocol frames

Course Outcomes:

- Implement data link layer framing methods
- Analyze error detection and error correction codes.
- Implement and analyze routing and congestion issues in network design.
- Implement Encoding and Decoding techniques used in presentation layer
- To be able to work with different network tools

List of Experiments

1. Implement the data link layer framing methods such as character, character-stuffing and bit stuffing.
2. Write a program to compute CRC code for the polynomials CRC-12, CRC-16 and CRC-CCIP
3. Develop a simple data link layer that performs the flow control using the sliding window protocol, and loss recovery using the Go-Back-N mechanism.
4. Implement Dijkstra's algorithm to compute the shortest path through a network
5. Take an example subnet of hosts and obtain a broadcast tree for the subnet.
6. Implement distance vector routing algorithm for obtaining routing tables at each node.
7. Implement data encryption and data decryption
8. Write a program for congestion control using Leaky bucket algorithm.
9. Write a program for frame sorting techniques used in buffers.
10. **Wire shark**
 - i. Packet Capture Using Wire shark
 - ii. Starting Wire shark
 - iii. Viewing Captured Traffic
 - iv. Analysis and Statistics & Filters.
1. How to run Nmap scan
2. Operating System Detection using Nmap
3. Do the following using NS2 Simulator
 - I. NS2 Simulator-Introduction
 - II. Simulate to Find the Number of Packets Dropped
 - III. Simulate to Find the Number of Packets Dropped by TCP/UDP
 - IV. Simulate to Find the Number of Packets Dropped due to Congestion
 - V. Simulate to Compare Data Rate & Throughput.
 - VI. Simulate to Plot Congestion for Different Source/Destination
 - VII. Simulate to Determine the Performance with respect to Transmission of Packets

TEXTBOOK:

1. Computer Networks, Andrew S Tanenbaum, David. j. Wetherall, 5th Edition. Pearson Education/PHI

REFERENCES:

1. An Engineering Approach to Computer Networks, S. Keshav, 2nd Edition, Pearson Education
2. Data Communications and Networking—Behrouz A. Forouzan. 3rd Edition, TMH.

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WEB PROGRAMMING LAB

Course Objectives:

- Learn HTML, CSS, Java Script for building responsive web interfaces.
- Understand PHP for handling forms, sessions, files, and databases.
- Explore XML structure, validation, and parsing using different techniques.
- Gain skills in database access using JDBC and SQL queries.
- Implement CMS platforms like Word Press and Joomla for dynamic websites.

Course Outcomes: Upon the completion of course, students are able to

- Design responsive websites using HTML, CSS, and Java Script effectively.
- Develop PHP applications for data input, validation, and storage.
- Manipulate and parse XML documents in web-based applications.
- Connect web applications to databases using PHP or JDBC.
- Create and manage CMS-based websites using Word Press and Joomla.

List of Experiments:

1. HTML

- A. Create a webpage with HTML describing your department. Use paragraph and list tags.
- B. Apply various colors to suitably distinguish keywords. Also apply font styling like italics, underline and two other fonts to words you find appropriate. Also use header tags.
- C. Create links on the words e.g. "Wi-Fi" and "LAN" to link them to Wikipedia pages.
- D. Insert an image and create a link such that clicking on image takes user to another page.
- E. Change the background color of the page. At the bottom create a link to take user to the top of the page.

2. HTML Tables

- A. Create a table to show your class time-table.
- B. Use tables to provide layout to your HTML page describing your university infrastructure.
- C. Use and <div> tags to provide a layout to the above page instead of a table layout.
- D. Use frames such that page is divided into 3 frames 20% on left to show contents of pages, 60% in center to show body of page, remaining on right to show remarks.
- E. Embed Audio and Video into your HTML webpage.

3. CSS

- A. Apply in-line CSS to change colors of certain text portion, bold, underline and italics certain words in your HTML webpage. Also change background color of each paragraph using in-line CSS.

- B. Write all the above styling in CSS indifferent file (.css) and link it to your webpage such that changes made in CSS file are immediately reflected on the page. Group paragraphs into single class and add styling information to the class in CSS.
 - C. Create a simple form to submit user input like his name, age, address and favourite subject, movie and singer.
 - D. Add few form elements such as radio buttons, check boxes and password field. Add a submit Button at last.
4. **JavaScript**
 - A. Create a form similar to the one in previous experiment. Put validation checks on values entered by the user using Java Script (such as age should be a value between 1 and 150).Write a Java Script program to display information box as soon as page loads.
 - B. Write a Java Script program to change back ground color after 5 seconds of page load.
 - C. Write a Java Script program to dynamically bold, italic and underline words and phrases based on user actions.
 - D. Write a JavaScript program to display a hidden div (e.g. showing stats of a player when user clicks on his name).
5. **PHP**
 - A. Design a PHP script to read user input from form controls (textboxes, radiobuttons, dropdowns) and display the submitted data.
 - B. Create a PHP program to handle file upload and store the file information in a specific directory.
 - C. Develop a PHP application to connect to a MySQL database, insert form data, and display retrieved records
 - D. Implement a PHP program to open, read, write, append, and delete text files and list all files in a directory.
6. **XML**
 - A. Create an XML document with custom tags, attributes, and define a DTD to validate its structure.
 - B. Write a PHP program to read and parse XML data using Simple XML and display it in tabular format..
 - C. Develop a PHP script to connect to a MySQL database and insert XML data into corresponding database tables
7. **Servlets**
 - A. Create user registration web Application.
 - B. At the server end, write code to retrieve contents of request object and show them to the user. Match user input password with predefined password and show “Valid User” or “Invalid User”
 - C. A web Application name as input and on submits it should show hello <name> it show start time at the right top corner of the page and provide a logout button. On clicking logout button should go to logout page shows Thank you <name> with duration of usage.
 - D. A web application that takes name and age from html page. If age less than

18 it should show Hello<name> You are not authorized to visit the site. Otherwise welcome<name>to website.

- E. A web Application name as input and on submit it should show hello <name> it show start time at the right top corner of the page and provide a logout button. On clicking logout button should go to logout page shows Thank you <name> with duration of usage.
- F. A web application that takes name and age from html page. If age less than 18 it should show Hello <name> You are not authorized to visit the site. Otherwise welcome <name >to website.
- G. Create XML Document that contain 10 users information
- H. Write a java program user Id as input and returns user details from XML file by using DOM Parser.
- I. Create XML Document that contain 10 users information
- J. Write a java program user Id as input and returns user details from XML file by using SAX Parser.

8. JDBC

- A. Establishing JDBC connection to any database (oracle/mysql,H2)
- B. Search the contents of Employee table/students table in JDBC
- C. Perform database CRED operations
- D. Using simple statements, prepared statements and callable statements

9. APPLET

- A. Create a web page using Java Script to display an image and play a sound with button-triggered events.
- B. Develop a PHP script to process HTTP form requests (GET/POST), display submitted data, and manage sessions.
- C. Write a Java Script program to change background color after 5 seconds of pageload.
- D. Write a Java Script program to dynamically bold, italic and underline words and phrases based on user actions.
- E. Write a JavaScript program to display a hidden div (e.g. showing stats of a player when user clicks on his name).

10. PHP

- A. Design a PHP script to read user input from form controls (textboxes, radiobuttons, dropdowns) and display the submitted data.
- B. Create a PHP program to handle file upload and store the file information in a specific directory.
- C. Develop a PHP application to connect to a MySQL database, insert form data, and display retrieved records
- D. Implement a PHP program to open, read, write, append, and delete text files and list all files in a directory.

11. XML

- A. Create an XML document with custom tags, attributes, and define a DTD to validate its structure.
- B. Write a PHP program to read and parse XML data using Simple XML and display it in tabular format..
- C. Develop a PHP script to connect to a MySQL database and insert XML data into corresponding database tables

12. Servlets

- A. Create user registration web Application.
- B. At the server end, write code to retrieve contents of request object and show them to the user. Match user input password with pre defined password and show "ValidUser" or "Invalid User"
- C. A web Application name as input and on submits it should show hello <name> it show start time at the right top corner of the page and provide a logout button. On clicking logout button should go to logout page shows Thank you <name> with duration of usage.
- D. A web application that takes name and age from html page. If age less than 18 it should show Hello<name> You are not authorized to visit the site. Otherwise welcome<name>to website.
- E. A web Application name as input and on submit it should show hello <name> it show start time at the right top corner of the page and provide a logout button. On clicking logout button should go to logout page shows Thank you <name> with duration of usage.
- F. A web application that takes name and age from html page. If age less than 18 it should show Hello<name> You are not authorized to visit the site. Otherwise welcome <name> to website.
- G. Create XML Document that contain 10 users information
- H. Write a java program user Id as input and returns user details from XML file by using DOM Parser.
- I. Create XML Document that contain10 users information
- J. Write a java program user Id as input and returns user details from XML file by using SAX Parser.

13. JDBC

- A. Establishing JDBC connection to any database (oracle/mysql,H2)
- B. Search the contents of Employee table/students table in JDBC
- C. Perform database CRED operations
- D. Using simple statements, prepared statements and callable statements

14. APPLET

- A. Create a web page using Java Script to display an image and play a sound with button-triggered events.
- B. Develop a PHP script to process HTTP form requests (GET/POST), display submitted data, and manage sessions.
- C. Create a PHP-based login page that uses cookies and session tracking to display a welcome message to the user

15. DATABASE HANDLING

- A. Develop a PHP-based login and registration system using sessions and database validation
- B. Install and configure a Word Press CMS locally or on a webhost, and create pages
- B. using templates, menus, and plug in.
- C. Create a simple blog using Joomla CMS by adding components, setting permissions, and customizing modules and menus

TEXT BOOKS:

- 1. Harvey Deitel, Abbey Deitel, Internet and World Wide Web: How To Program 5th

Edition.

2. Java Script: The Definitive Guide by David Flanagan, O 'Reilly Media, Latest Edition.
3. Web Technologies: HTML, JavaScript, PHP, Java, JSP, ASP. NET, XML and Ajax by Uttam K. Roy, Oxford University Press
4. Michael Morrison XML Unleashed Techmedia SAMS.
5. Web Technologies, Uttam KRoy, Oxford University Press

REFERENCE BOOKS:

1. John Pollock, Javascript–ABeginners Guide, 3rd Edition--Tata McGraw-Hill Edition.
2. Keyur Shah, Gateway to Java Programmer Sun Certification, Tata Mc Graw Hill, 2002.
3. Developing Java Web Services, R. Nagappan, R. Skoczylas, R. P. Sriganesh, Wiley India.
4. Developing Enterprise Web Services ,S. Chatterjee, J. Webber, Pearson Education.
5. XML, Web Services, and the Data Revolution, F. P. Coyle, Pearson Education.
6. Building web Services with Java, 2nd Edition, S. Graham and others, Pearson Education.
7. Java Web Services, D. A. Chappell & T. Jewell, O "Reilly, SPD.
8. Mc Govern, et al., "Java web Services Architecture", Morgan Kaufmann Publishers, 2005.

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NODEJS/REACTJS/DJANGO, UIDESIGN-FLUTTER**Prerequisites:** Object Oriented Programming through Java, HTML Basics.**Course Objectives:**

- To implement responsive web pages using HTML, CSS3, Bootstrap, and Java Script validation.
- To develop full-stack applications with Node.js, Express, React.js, and secure the musing JWT.
- To build and integrate RESTful APIs using Node.js and Django with frontend CRUD operations.
- To create Flutter apps with responsive layouts, state management, and custom widgets.
- To enhance Flutter apps by integrating REST APIs and adding animations for better user experience.

Course Outcomes:

- Design responsive web pages using HTML, CSS, Bootstrap, and Java Script.
- Develop backend applications using Java and Node.js.
- Build single-page applications with React.js.
- Create Flutter apps with custom widgets, layouts, and forms.
- Integrate APIs, add animations, and perform UI testing in Flutter apps.

List of Experiments: Students need to implement the following experiments

1. Build a responsive website with registration, login, catalog, and cart pages using HTML, CSS3, Bootstrap, and JavaScript validation.
2. Create a react application for the student management system having registration, login, contact, about pages and implement routing to navigate through these pages
3. Create a service in react that fetches the weather information from open weather map. Org and the display the current and historical weather information using graphical representation using chart.js
4. Develop an express web application that can interact with REST API to perform CRUD operations on student data. (Use Postman)
5. Implement JWT authentication in Node.js to create secure end points.
6. Create a TODO application in react with necessary components and deploy it into github.
7. Integrate a React frontend with Node.js backend to perform CRUD operations on a shared dataset (e.g., MongoDB, MySQL.)
8. Build a Django REST API for managing student data, tested using Postman.
9. Install Flutter and Dart SDK; Write Dart programs on data types, control flow, Functions, Class & Objects and collections to understand syntax and features.
10. Create a Flutter app show casing common widgets (Text, Image, Container, Card, List View).
11. Design a responsive UI using Row, Column, Stack, media queries, and break points.
12. Implement screen navigation using Navigator and named routes.
13. Use stateful & stateless widgets; manage state using Provider or set State
14. Design a form in Flutter within put fields, validation, and error handling (e.g., student

registration form).

15. Fetch and display data from a REST API (e.g., weather or student info) in Flutter.
16. Add basic animations (fade or slide) to a Flutter app for enhancing UI interactions

TEXT BOOK:

1. Marco L. Napoli, Beginning Flutter: A Hands-on Guide to App Development.

REFERENCE BOOKS:

1. Jon Duckett, Beginning HTML, XHTML, CSS, and Java Script, Wrox Publications, 2010
2. Bryan Basham, Kathy Sierra and Bert Bates, Head First Servlets and JSP, O'Reilly Media, 2nd Edition, 2008.
3. Vasam Subramanian, Pro MERN Stack, Full Stack Web App Development with Mongo, Express, React, and Node, 2nd Edition, A Press.

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INDIAN KNOWLEDGE SYSTEM**(Common for IT, CSE(AIML), CSE(DS))**

Bharat is considered one of the oldest civilizations of the world. Some of the archaeological evidences proved the existence of Indus Valley Civilization in 7000 B.C. Bhartiya traditions, culture, cultural activities, rituals, sacraments, painting, art of dancing, art of singing etc. is being practised till the modern times without knowing scientific approaches behind that. Eternity of Indian knowledge system proved itself that not only many rituals but also many traditions, many streams of knowledge like astrology, mathematics, physics, chemistry, biology, language studies, yoga and meditation had been following from the starting till now with some changes, in the form of traditions.

This course is for undergraduate students to inculcate Indian values. It will promote advance study and inter disciplinary research on all aspects of the Indian knowledge system.

Course Objectives: This course aims:

- To provide a tribute of the rich culture and traditions of Indian knowledge system to students of various disciplines.
- To introduce historical account on the education and scientific literature available in ancient Indian traditions and its connections with ancient Indian Philosophy
- To give insights about the applications of Bharatiya Jnana Parampara 4. To introduce Indian approach towards health and wellbeing
- To elaborate vast contribution of ancient Indian researchers, engineers, scientists and architects to the modern world

Course Outcomes: Students will be able to:

- Understand nature, scope and related fields of Indian knowledge system.
- Demonstrate the scientific literature available in ancient Indian traditions
- Understanding the application of Bharatiya Jnana Parampara
- Understand Indian approach towards Well being
- Appreciate vast contribution of ancient Indian researchers, engineers, scientists and architects to the modern world

Unit 1: Introduction to Indian Knowledge Systems

Meaning, Nature, Scope and Salient Aspects of Bharatiya Jnana Parampara - Introduction to Vedas, Upanishads, Vidya, Kala, Jnana, Shastra - Practices and Continuity of Tradition

Unit 2: Overview of History of Indian Education and Scientific Literature

Gurukul System - Role of Sanskrit in Natural Language Processing - Scientific Literature - Vedic Literature - Available Scientific Treatises- Inter linkings

Unit 3: Introduction to Scientific Theories from Pure Sciences from Ancient Indian Knowledge Systems

Overview of theories from available ancient Indian Literature about Physics, Chemistry and Mathematics- Inter linkings and applications

Unit 4: Introduction to Ancient Indian Wellness Systems

Concept of Wellness-Yoga System- Ayurveda System-Ancient Indian Aesthetics

Unit 5: Development of Engineering, Science, Technology & Fine Arts in India

Various Industries - Silk, Cotton and Ship Building - Evolution of Indian Fine Arts Cave

and Temple Architecture, Vastu - Vidya, Sculpture, Forts and Stepwells, Observatories and Paintings - Music and Natyakala - Cultural Traditions & Folk Arts

• **Pedagogy for Teachers: Apart from Class Room Instruction, the following Methods are Suggested.**

1. Project based activities and learning.
2. Presentation and case studies.
3. Film screening and book reviews.
4. Visit to historical places, archives centre, research centre or library nearby.

Note: Activities mentioned above are only suggestive. Teacher-educators should encourage students to be innovative.

Suggested Readings:

1. B. Mahadevan, Bhat Vinayak and Nagendra Pavan R.N., (2022) 'Introduction to Indian Knowledge Systems: Concepts and Applications' PHI learning PVT, New Delhi ISBN [9789391818203]
2. Dharmapal (1971) 'Indian Science and Technology in the Eighteenth Century'. Other India Press, Goa.
3. Kapil Kapoor, Singh Avdhesh Kumar, (2005) 'Indian Knowledge Systems' D.K. Printworld (P) Ltd. ISBN 10: 8124603367 / ISBN 13: 9788124603369
4. Chakradeo Ujwala, Temples of Bharat, Aayu Publications, New Delhi, 2024.
5. D.N.Bose, S.N. Senand B.V. Subbarayappa, *A Concise History of Science in India*, Indian National Science Academy, New Delhi, 2009.
6. Datta B. and A.N. Singh, *History of Hindu Mathematics: Parts I and II*, Asia Publishing House, Bombay, 1962.
7. Kapoor, K. (2021), *Indian Knowledge System: Nature, Philosophy, Character in Indian Knowledge System*, vol. 1, Pub. Indian Institute of Advanced Studies, Shimla
8. Mahadevan, B., Bhat, V.R., Pavana, N. (2022), *Philosophical Systems*, in *Introduction to Indian Knowledge System*, Pub. PHI Learning, New Delhi.
9. Mahadevan, B., Bhat, V.R., Pavana, N. (2022), *Knowledge: Framework and Classification*, in *Introduction to Indian Knowledge System*, Pub. PHI Learning, New Delhi.

Video Resources:

1. Introductory lectures by Prof. Gauri Mahulikar
2. Introductory lectures by Prof. Kapil Kapoor

Websites:

- <https://iksindia.org/index.php>
- Official Website of IKS-Indian Knowledge System
- <https://www.youtube.com/watch?v=uKcf-hSlcUE>
- Address by Prof Kapil Kapoor | Indian Institute of Advanced Study (FDP2021)
- https://www.youtube.com/watch?v=MDJTXNiH2_A
- Mukul Kanitkar on Bharatiya Knowledge System
- <https://www.youtube.com/watch?v=uARMhv97pjk>
- <https://www.youtube.com/watch?v=oTwgf56GbsA>
- Scientific History of India | Mukul Kanitkar Lecture in DTU
- <https://youtu.be/gNJNmPJqXJc?si=WFBbuUT65mLZzpOW>
- Ancient India's Scientific Achievements & Contribution in Mathematics, Astronomy, Science & Medicine.