

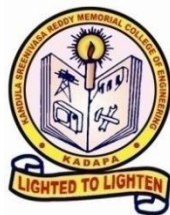
**DEPARTMENT OF
COMPUTER SCIENCE AND ENGINEERING**

COURSE STRUCTURE AND SYLLABUS

FOR

B.Tech CSE (V Sem - VI Sem) (R18 Regulations)

**(Effective from 2018-19 for Regular students and from 2019-20 for Later
Entry students)**



**KANDULA SREENIVASA REDDY MEMORIAL COLLEGE OF
ENGINEERING (AUTONOMOUS)
KADAPA - 516005, AP**

**(Approved by AICTE, Affiliated to JNTUA, Ananthapuramu, Accredited by NAAC)
(An ISO 9001-2008 Certified Institution)**

COMPUTER SCIENCE AND ENGINEERING

V SEMESTER

Subject Code	Subject Category	Course Name	L	T	P	IM	EM	CR
1805501	PCC	Web Technologies	2	0	0	30	70	2
1805502	PCC	Data Base Management Systems	3	0	0	30	70	3
1805503	PCC	Computer Networks	3	0	0	30	70	3
1805504	PCC	Software Engineering	3	0	0	30	70	3
1805505 1805506 1805507	PEC	Professional Elective-1 1. Human Computer Interaction 2. Multimedia Systems 3. Distributed Systems	3	0	0	30	70	3
1805508	PCC	Compiler Design	3	0	0	30	70	3
1825509	PCC	Constitution of India	2	-	-	30	--	0
1805510	PCC	Databases Lab	0	0	2	50	50	1
1805511	PCC	Web Technologies Lab	0	0	2	50	50	1
1824512	HSC	Advanced English and Communications Skills lab	0	0	2	50	50	1
1805513	Project	Socially Relevant Project	0	0	4	100	--	2
TOTAL			19	0	10	460	570	22

VI SEMESTER

Subject Code	Subject Category	Course Name	L	T	P	IM	EM	CR
1805601	PCC	Internet of Things	3	0	0	30	70	3
1805602	PCC	Data Mining	3	0	0	30	70	3
1805603 1805604 1805605	PEC	Professional Elective-2 1. Artificial Intelligence 2. Software Testing 3. Mobile Adhoc Networks	3	0	0	30	70	3
18OE501 18OE502	OEC	Open Elective-1 1. Data Structures 2. Database Management Systems	3	0	0	30	70	3
1825609	HSC	Management Science	3	0	0	30	70	3
1805608	PCC	Mobile Application Development	3	0	0	30	70	3
1805609	PCC	Internet of Things Lab	0	0	2	50	50	1
1805610	PCC	Mobile Application Development Lab	0	0	2	50	50	1
1805611	Project	Internship	--	--	--	100	--	2
TOTAL			18	0	04	380	520	22

R18-CSE- V Semester

Course Title	WEB TECHNOLOGIES				B.Tech V Sem (R18) CSE			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1805501	PCC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		2	0	0	2	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs			
Course Objectives:								
<ul style="list-style-type: none"> To learn the basic web concepts and Internet protocols. To introduce client side scripting with Java script and HTML. To introduce server side programming with PHP. 								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Define web server and installations of various web servers.							
CO 2	Understand the scripting languages HTML, CSS, Java Script and create static web pages.							
CO 3	Interpret the server side scripting PHP and create dynamic web pages.							
CO 4	Outline the advanced concepts of PHP and design web pages to authenticate users.							
CO 5	Develop server side programs using PHP and accessing database through PHP.							

UNIT - I

Introduction to Web Technologies: Introduction to Web servers like Apache1.1,IIS XAMPP(Bundle Server), WAMP(Bundle Server), Handling HTTP Request and Response, installations of above servers.

UNIT - II

HTML Common tags: List, Tables, images, forms, Frames; Cascading Style sheets;

Introduction to Java Script: Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script.

UNIT - III

Overview of PHP Data types and Concepts: Variables and data types, Operators, Expressions and Statements, Strings, Arrays and Functions.

Overview of Classes, Objects, and Interfaces: Creating instances using Constructors, Controlling access to class members, Extending classes, Abstract classes and methods, using interfaces, Using class destructors, File Handling and Using Exceptions.

UNIT - IV

PHP Advanced Concepts: Using Cookies, Using HTTP Headers, Using Sessions, Authenticating users, Using Environment and Configuration variables, Working with Date and Time.

UNIT - V

Using Creating and Forms: Understanding Common Form Issues, GET vs. POST, Validating form input.

PHP and Database Access: Basic Database Concepts, Connecting to a MYSQL database, Retrieving and Displaying results, Modifying, Updating and Deleting data..

Text Books:

1. Beginning PHP and MySQL, 5th Edition, Jason Gilmore, Apress Publications (Dream tech.)
2. PHP 5 Recipes A problem Solution Approach Lee Babin, Nathan A Good, Frank M.Kromann and Jon Stephens.
3. Web Programming, building internet applications, Chris Bates 3rd edition, WILEY Dreamtech.
4. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage LearningPublications.

References: Books:

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware(Addison Wesley) Pearson Education.
2. PHP 5.1, I Bayross and S. Shah, The X Team, SPD
3. PHP and My SQL by Example, E. Quigley, Prentice Hall (Pearson).
4. PHP Programming solutions, V. Vaswani. TMH.

Course Title	DATABASE MANAGEMENT SYSTEMS				B.Tech V Sem (R18) CSE			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1805502	PCC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs			
Course Objectives:								
<ul style="list-style-type: none"> To study the physical and logical database designs, database modeling, relational, hierarchical and network models. To understand and use data manipulation language to query, update, and manage a database To develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency. 								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	To understand the basic concepts and the application of Database systems.							
CO 2	To understand the basics of SQL and construct queries using SQL.							
CO 3	To understand the Relational Database design principles.							
CO 4	To apply concurrency control and recovery techniques during transaction execution.							

UNIT - I

Introduction - Database-System Applications, Purpose of Database Systems, View of Data, Database languages, Data base architecture, Database Users and Administrators.

Introduction to the Relational Model - Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations.

Database Design and the E-R Model - Overview of the Design Process, The Entity Relationship Model, Constraints, Removing Redundant Attributes in Entity Sets, Entity Relationship Diagrams.

UNIT - II

Introduction to SQL - Overview of the SQL Query Language, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Sub queries, Modification of the Database.

Advanced SQL - Integrity Constraints, SQL Data Types and Schemas, Functions and Procedures, Triggers.

Other Relational Query Languages - The Relational Algebra, Tuple Relational Calculus, Domain Relational-calculus.

UNIT - III

Schema Refinement and Normal Forms - Schema Refinement – Problems Caused by Redundancy, Decompositions, Problems related to decomposition. Reasoning about Functional Dependencies, First, Second, Third Normal forms, BCNF. Lossless join Decomposition, Dependency- preserving Decomposition. Schema refinement in Data base Design, Multi valued Dependencies, Fourth Normal Form, Join Dependencies, Fifth Normal Form, Inclusion dependencies.**UNIT - IV**

Query Processing and Optimization- Overview, Measures of Query Cost, Selection Operation, Transformation of Relational Expressions.

Transactions - Transaction Concept, A Simple Transaction Model, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Transaction Isolation and Atomicity, Transaction Isolation Levels, Implementation of Isolation Levels, Transactions as SQL Statements .

UNIT - V

Concurrency Control - Lock-Based Protocols, Deadlock Handling, Multiple Granularity, Timestamp-Based Protocols, Validation-Based Protocols, Multi version Schemes, Snapshot Isolation, Insert Operations, Delete Operations, and Predicate Reads.

Recovery System - Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Buffer Management, Failure with Loss of Non-volatile Storage, Early Lock Release and Logical Undo Operations, Remote Backup Systems.

Text Books:

- 1.Silberschatz,Korth,DatabasesystemConcepts.5thEdition,McGrawhill.
- 2.Raghurama Krishnan, Johannes Gehrke, Data base Management Systems. 3rd Edition, Tata McGrawHill.
- 3.Elmasri, Navathe, Fundamentals of Database Systems, Pearson Education.
4. C.J.Date, Introduction to Database Systems

Reference Books:

1. Peter Rob, Ananda Rao and Carlos Corone, Database Management Systems, Cengage Learning.
2. Ramez Elmasri, Shamkanth B. Navathe, Fundamentals of Database Systems, 7th Edition, Pearson.
3. Abraham Sliberschatz, Henry F. Korth, S. Sudarshan, Database System Concepts, Indian Edition, McGraw Hill.

Course Title	COMPUTER NETWORKS				B.Tech V Sem (R18) CSE			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1805503	PCC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs			
Course Objectives:								
<ul style="list-style-type: none"> • Study the evolution of computer networks and future direction. • Study the concepts of computer networks from layered. • Perspective study the issues open for research in computer networks. 								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Understand the terminology and concepts of the OSI reference model and TCP-IP.							
CO 2	Describe the functions of Data link layer and its protocols.							
CO 3	Classifying the different routing algorithms and IP addressing with network layer							
CO 4	Understand connection establishment and services provides by TCP and UDP.							
CO 5	Explain the working of DNS and World Wide Web.							

UNIT - I

Introduction: Uses of Computer Networks, Network Hardware, Reference Models: OSI, TCP/IP, Comparison of OSI & TCP/IP reference models.

Introduction to physical layer: Data and Signals, Transmission impairment, Datarate limits, Performance.

Transmission media: Introduction, Guided Media, Unguided Media

Switching: Introduction, Circuit Switched Networks, Packet Switching

UNIT - II

The Data Link Layer: Data Link Layer design issues, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window Protocols.

The Medium Access Control sublayer : Multiple Access protocols, Ethernet, Data Link Layer Switching.

UNIT - III

The Network Layer: Network layer design issues, Routing algorithms : The Optimality Principle, Shortest Path Algorithm, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing, Broadcast Routing, Multicast Routing, Anycast Routing,

Congestion control algorithms, Quality of service, IP Addresses, IPv4,IPv6,Tunneling, Fragmentation.

UNIT - IV

The Transport Layer: The Transport Service, Elements of Transport Protocols, Congestion Control, The internet transport protocols: UDP, TCP: Introduction to TCP, Service Model, Protocol, Segment Header, Connection Establishment, Connection Release.

UNIT - V

The Application layer: Domain Name System (DNS), World Wide Web (WWW), E-mail.

Text Books:

1. “Computer Networks”, Andrew S. Tanenbaum, David J.Wetherall, Pearson, 5th edition, 2010.
2. “Data communications and networking”, Behrouz A. Forouzan, TMH, 5th edition, 2012.
3. “Internetworking with TCP/IP – Principles, protocols, and architecture- Volume 1,Douglas E. Comer, 5 th edition, PHI
4. “Computer Networks”, 5E, Peterson, Davie, Elsevier.

Reference Books:

1. “Introduction to Computer Networks and Cyber Security”, Chawan- Hwa Wu, Irwin, CRC Publications.
2. “Computer Networks and Internets with Internet Applications”, Comer.
3. Computer Networks, A Top-Down Approach, James F. Kurose, Keith W. Ross, 3rd Edition, Pearson.
4. Computer Networks, A Top-Down Approach, Behrouz A. Forouzan, Firoz Mosharraf, Special Indian Edition, McGraw Hill.

Course Title	SOFTWARE ENGINEERING				B.Tech V Sem (R18) CSE			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1805504	PCC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs			
Course Objectives:								
<ul style="list-style-type: none"> • Knowledge of basic Software engineering methods and practices, and their appropriate application also the software engineering layered technology and Process frame work. • A general understanding of software process models such as the waterfall and evolutionary models. • Understanding of the role of project management including planning, scheduling, risk management, etc. • Understanding of data models, object models, context models and behavioural models also different software architectural styles. • Understanding of software testing approaches such as unit testing and integration testing other testing strategies and Risk management. 								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Ability to apply software engineering principles and techniques.							
CO 2	Ability to develop, maintain and evaluate large-scale software systems.							
CO 3	To produce efficient, reliable, robust and cost-effective software solutions.							
CO 4	To manage time, processes and resources effectively by prioritising competing demands to achieve personal and team goals Identify and analyzes the common threats in each domain.							

UNIT - I

Software and Software Engineering: The Nature of Software, Software Engineering, Software Process Software Myths. Process Models: A Generic Process Model, Prescriptive Process Models, Specialized Process Models, The Unified Process, Personal and Team Process Models.

UNIT - II

Understanding Requirements: Requirements Engineering, Establishing the Groundwork, Eliciting Requirements, Building the Requirements Model, Negotiating Requirements, Validating Requirements.

Requirements Modeling: Requirements Analysis, Scenario-Based Modeling, Data Modeling Concepts, Class-Based Modeling.

UNIT - III

Design Concepts: Design within the Context of Software Engineering, Design Process, Design Concepts, The Design Model.

Architectural Design: Software Architecture, Architectural Genres, Architectural Styles, Architectural Design.

UNIT - IV

User Interface Design: The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps, Design Evaluation.

Coding and Testing: Testing, Testing in the Large versus Testing in the Small, Unit Testing, Integration Testing, Black-Box Testing, White-Box Testing, Debugging, System Testing.

UNIT - V

Software Project Management: Project Planning, Metrics for Project Size Estimation, Project Estimation Techniques, Empirical Estimation Techniques, COCOMO-A Heuristic Estimation Technique, Halstead's Software Science-An Analytical Technique, Risk Management.

Text Books:

1. Software Engineering: A practitioner's Approach, Roger S. Pressman, Seventh Edition, 2010, McGrawHill International Edition.
2. Fundamentals of Software Engineering, Rajib Mall, 4th Edition, 2014, PHI.
3. Software Engineering, Ian Sommerville, Ninth edition, Pearson education.
4. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008

Reference Books:

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India,2010.
2. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
3. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.
4. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition , 2006.
5. Software Engineering Foundations, Yingxu Wang, Auerbach Publications,2008.

Course Title	HUMAN COMPUTER INTERACTION (Professional Elective-1)				B.Tech V Sem (R18) CSE			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1805505	PEC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs			
Course Objectives:								
<ul style="list-style-type: none"> To gain an overview of Human-Computer Interaction (HCI), with an understanding of user interface design in general. To apply models from cognitive psychology to predicting user performance in various human-computer interaction tasks and recognize the limits of human performance as they apply to computer operation. Evaluate techniques in interface design. 								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Ability to identify screen elements to solve real time problems.							
CO 2	Ability to identify and implement proper components for different web needs.							
CO 3	Ability to apply HCI and principles to interaction design.							
CO 4	Ability to explore different devices based on social needs.							

UNIT - I

Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design.

The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT - II

Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business functions- Business definition and requirement analysis, Basic business functions.

UNIT - III

Screen Designing:- Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT - IV

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls. Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

UNIT - V

Software tools: Specification methods, Interactive-building tools, Evaluation and Critiquing tools. Interactive devices: Interactive device- keyboards and function keys- pointing devices- Speech reorganization, digitalization and generation- Image and video displays – Printers.

Text Books:

1. The essential guide to user interface design, Wilbert O Galitz, Wiley Dream Tech.
2. Designing the user interface. 3rd Edition Ben Shneidermann, Pearson Education Asia.
3. Human – Computer Interaction. Alan Dix, Janet Finckay, Gre Goryd, Abowd, RussellBealg, Pearson Education.
4. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech.

Reference Books:

1. User Interface Design, Soren Lauesen, Pearson Education.
2. Human –Computer Interaction, D. R. Olsen, Cengage Learning.
3. Human –Computer Interaction, Smith - Atakan, Cengage Learning.
4. Human-Computer Interaction Fundamentals and Practices, Gerard Jounghyun Kim, CRC Press

Course Title	MULTIMEDIA SYSTEMS (Professional Elective-1)				B.Tech V Sem (R18) CSE			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1805506	PEC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs			
Course Objectives:								
<ul style="list-style-type: none"> To adapt the architecture for design of multimedia system. To solve issues related to multimedia file handling. To adopt hypermedia standards in developing multimedia applications. Know the basics of creating multimedia applications. 								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Analyze and synthesis the key components of multimedia technologies including text, audio and graphics.							
CO 2	Understand the key components of multimedia technologies including video, animation and compression techniques.							
CO 3	Examine various process scheduling techniques.							
CO 4	Recall the data storage and retrieval methods.							
CO 5	Interpret reference model for multimedia synchronization and summarize applications of multimedia.							

UNIT - I

Multimedia: Definition, Where to use multimedia, Medium, Main properties of multimedia system, Traditional data stream characteristics, Data stream characteristics for continuous media, Information units.

Sound/Audio: Basic sound concepts, Music, Speech.

Images/Graphics: Basic concepts, Computer image processing.

UNIT - II

Video and Animation: Basic concepts, Television, Computer based animation.

Data Compression: Storage space, Coding requirements, Source, Entropy and Hybrid coding, Some basic compression techniques, JPEG, H.261,(Px64), MPEG, DVI.

UNIT - III

Computer Technology: Communication Architecture, Multimedia Workstation.

Multimedia Operating Systems: Introduction, Real time, Resource management, Process management.

Multimedia Communication systems: Application Subsystem, Transport subsystem.

UNIT - IV

Database Systems: Multimedia Database Management System, Characteristics of an MDBMS, Data Analysis, Data Structure, Operations on data, Integration in a Database model.

Documents, Hypertext and MHEG: Documents, Hypertext and Hypermedia, Document Architecture ODA, MHEG.

UNIT - V

Synchronization: Introduction, Notion of Synchronization, Presentation requirements, Reference model for multimedia synchronization, Synchronization specifications.

Multimedia Applications: Introduction, Media Presentation, Media Composition, Media Integration, Media Communication, Media Consumption, and Media Entertainment.

Text Books:

1. "Multimedia: Computing, Communications and Applications", Ralf Steinmetz and Klara Nahrstedt, Pearson Education.
2. "Multimedia: Making It work:", Tay Vaughan, Pearson Education.
3. "Multimedia Systems", Koegel Buford, Pearson Education
4. "Fundamentals of Multimedia", Ze-Nian Li, Mark.S.Drew, Springer.

Reference Books:

1. "Multimedia System design", Prabhat K. Andheigh, Kiran Thakrar, THM
2. "Multimedia Communication Systems: Techniques, standards and networks, K.R.Rao,D.Milovanovic.
3. Introduction to Multimedia, Ramesh Bangia, Firewall Media.
4. Principles of Multimedia, 2nd Edition, Ranjan Parekh, MAT Lab examples.

Course Title	DISTRIBUTED SYSTEMS (Professional Elective-1)				B.Tech V Sem (R18) CSE			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1805507	PEC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs			
Course Objectives:								
<ul style="list-style-type: none"> To make the student to understand the features of distributed systems. Creating awareness among students on processes and synchronization among processes. Learn the concepts of consistency models, replication and fault tolerance in distributed systems. 								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Identify the core concepts of distributed systems.							
CO 2	Understand the concepts of threads and communication mechanisms for processes.							
CO 3	Develop the clock synchronization, mutual exclusion and election algorithms.							
CO 4	Analyze the consistency and replication models.							
CO 5	Understand the fault tolerance mechanisms in distributed systems.							

UNIT - I

Introduction: Definition of a distributed system, Goals, Types of distributed systems.

Architectures: Architecture styles, System architectures.

UNIT - II

Processes: Threads, virtualization, clients, servers, code migration.

Communication: Fundamentals, Remote Procedure Call, Message oriented communication, Stream oriented communication, Multicast communication.

UNIT - III

Synchronization: Clock synchronization, Logical clocks, Mutual exclusion, Election Algorithms.

UNIT - IV

Consistency and Replication: Introduction, Data centric consistency models, Client centric consistency models, Replica management, Consistency protocols.

UNIT - V

Fault Tolerance: Introduction to fault tolerance, Process resilience, Reliable client server communication, Reliable group communication, Distributed commit, Recovery.

Text Books:

1. Andrew S. Tanenbaum, Marteen Van Steen, “Distributed Systems: Principles and Paradigms”, 2nd Edition, PHI.
2. George Coulouris, Jean Dollimore, Tim Kindberg, “Distributed Systems – Concepts and Design”, Fourth Edition, Pearson Education.
3. Andrew S. Tanenbaum, “Distributed Operating System”, Pearson Education.
4. Pradeep K. Sinha, “Distributed Operating Systems – Concepts and Design”, PHI publications.

Reference Books:

1. Distributed Systems and Algorithm Analysis, Randy Chew, Theodore Johnson, Pearson.
2. Distributed Systems and Paradigms, Andrew. S. Tanenbaum, Maarten Van Steen, 2nd Edition, Pearson.
3. Distributed Systems: Computing over Network, Joel M. Crichlow, 2nd Edition, PHI.

Course Title	COMPILER DESIGN				B.Tech V Sem (R18) CSE			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1805508	PCC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs			
Course Objectives:								
<ul style="list-style-type: none"> To make the student to understand the process involved in compilation. Creating awareness among students on various types of parsers. Understand the syntax analysis, intermediate code generation, type checking, and the role of symbol table. 								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Understand and analyze the various phases of Compiler.							
CO 2	Identify the tokens using lexical analyzer techniques.							
CO 3	Categorize and implement parsing techniques.							
CO 4	Understand syntax directed definition and develop type checking semantics using synthesized and inherited attributes.							
CO 5	Understand the storage allocation and intermediate code representations.							
CO 6	Summarize the code optimize techniques and demonstrate code generation technique and concepts.							

UNIT - I

Introduction to Compiling: Compilers, Analysis of the Source program, the phases of a compiler, the cousins of the Compiler, grouping of phases, Compiler construction tools.

Lexical Analysis: The role of the analyzer. Input buffering, Specification of tokens, Recognition of tokens, A language for Specifying Lexical analyzer.

UNIT - II

Syntax Analysis: The role of the parser, Context-free grammars, writing a grammar, Top down parsing, Bottom-up parsing, Operator-precedence parsing, LR parsers, Parser generators.

UNIT - III

Syntax Directed Translation: Syntax-directed definitions, Construction of syntax trees, S-attributed definitions, L-attributed definitions.

Type Checking: Type systems, Specification of simple type checker, Equivalence of type expressions, type conversions.

UNIT - IV

Run-Time Environments: Source Language issues, storage organization, Storage-allocation strategies, Access to non local names, Symbol tables.

Intermediate Code generation: Intermediate languages, three address code, quadruple, triple and indirect triple.

UNIT - V

Code Generation: Issues in the Design of a code generator, The target machine, Basic blocks and flow graphs, Next-use information, A simple code generator, Register allocation and assignment, DAG representation of basic blocks, peephole optimization.

Code Optimization: Introduction, the principle source of optimization.

Text Book:

1. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman, Compilers-Principles, Techniques and Tools, Pearson Education.
2. Alfred V. Aho, Jeffrey D. Ullman, Principles of Compiler Design. Narosa Publications.
3. K. V. N. Sunitha, Compiler Construction, Pearson Education.
4. K. Muneeswaran, Compiler Design, Oxford university press

Reference Books:

1. Introduction to Compiler Design, Torben Egidius Mogensen, 2nd Edition, Springer.
2. Principles of Compiler Design, Nandini Prasad K.S, 3rd Edition, Cengage Publication.
3. Compiler Design, Santanu Chattopadhyay, PHI.
4. Principles of Compiler Design, M. Ganga Durga, T.G. Mani Kumar, MJP Publishers.

Course Title	CONSTITUTION OF INDIA (Mandatory Course)				B.Tech V Sem (R18) CSE			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1825509	MC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		2	-	-	0	30		30
Mid Exam Duration: 2 Hours								
Course Objectives:								
<ul style="list-style-type: none"> • To understand the premises informing the twin themes of liberty and freedom from a civil rights perspective. • To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism. • To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution. 								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Understand the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.							
CO 2	Tell the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.							
CO 3	Explain the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.							
CO 4	Define the passage of the Hindu Code Bill of 1956.							

UNIT - I

History of Making of the Indian Constitution:

History, Drafting Committee, (Composition & Working)

Philosophy of the Indian Constitution:

Preamble, Salient Features

UNIT - II

Contours of Constitutional Rights & Duties:

Fundamental Rights, Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies, Directive Principles of State Policy, Fundamental Duties.

UNIT - III

Organs of Governance:

Parliament, Composition, Qualifications and Disqualifications, Powers and Functions

Executive:

President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions.

UNIT - IV

Local Administration:

District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation.

Pachayati raj: Introduction, PRI: Zila Pachayat.

Elected officials and their roles, CEO Zila Pachayat: Position and role.

Block level: Organizational Hierarchy (Different departments),

Village level: Role of Elected and Appointed officials, Importance of grass root democracy.

UNIT - V

Election Commission:

Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners.

State Election Commission: Role and Functioning.

Institute and Bodies for the welfare of SC/ST/OBC and women.

Text Books:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.
3. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.

Course Title	DATABASES LAB				B.Tech V Sem (R18) CSE			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1805510	PCC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		0	0	2	1	50	50	100
					End Exam Duration: 3Hrs			
Course Objectives:								
<ul style="list-style-type: none"> This course will enable students to Foundation knowledge in database concepts, technology and practice to groom students into well-informed database application developers. Strong practice in SQL programming through a variety of database problems. Develop database applications using front-end tools and back-end DBMS. 								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Construct, Update and query on the database.							
CO 2	Demonstrate the working of different concepts of DBMS							
CO 3	Implement, analyse and evaluate the project developed for an application.							

LIST OF SAMPLE EXPERIMENTS

1. Practicing DDL Commands.
2. Practicing DML Commands.
3. Implementation of Aggregate operations.
4. Implementation of special operators such as LIKE, BETWEEN, IN, EXISTS etc.
5. Implementation of SET operations (UNION, INTERSECTION, MINUS, JOIN etc)
6. Implementation of Oracle Functions.
7. Creating Views, Updatable views.
8. Creation of Triggers.
9. Creation of Cursors.
10. Writing sample programs in PL/SQL.

Text Books:

1. Silberschatz, Korth, Database System Concepts. 5th Edition, McGraw Hill.
2. Raghurama Krishnan, Johannes Gehrke, Database Management Systems. 3rd Edition, Tata McGraw Hill.
3. Elmasri, Navathe, Fundamentals of Database Systems, Pearson Education.
4. C.J. Date, Introduction to Database Systems

Reference Books:

1. Peter Rob, Ananda Rao and Carlos Corone, Database Management Systems, Cengage Learning.
2. Ramez Elmasri, Shamkanth B. Navathe, Fundamentals of Database Systems, 7th Edition, Pearson.
3. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Database System Concepts, Indian Edition, McGraw Hill.

Course Title	WEB TECHNOLOGIES LAB				B.Tech V Sem (R18) CSE			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1805511	PCC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		0	0	2	1	50	50	100
					End Exam Duration: 3Hrs			
Course Objectives:								
<ul style="list-style-type: none"> To learn the basic web concepts and Internet protocols. To introduce client side scripting with Java script and HTML. To introduce server side programming with PHP. 								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Design static web pages using HTML, CSS and Java Script.							
CO 2	Create dynamic web pages using PHP and Java Script.							
CO 3	Design web pages to authenticate users using Cookies.							
CO 4	Develop server side programs using PHP and accessing database through PHP.							

HARDWARE AND SOFTWARE REQUIRED

1. A working computer system with either Windows or Linux
2. A web browser either IE or Firefox
3. Apache web server or IIS Web server
4. A database either Mysql or Oracle

LIST OF EXPERIMENTS

1. Basic HTML Tags, Table Tags, List Tags, Image Tags, Forms
2. Implement forms using HTML, FRAMES, CSS.
3. Write *JavaScript* to validate the following fields of the above registration page.
 - a. Name (Name should contains alphabets and the length should not be less than 6 characters).
 - b. Password (Password should not be less than 6 characters length).
 - c. E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com)
 - d. Phone number (Phone number should contain 10 digits only).
4. Install the following on local machine
 - Apache web server
 - Tomcat application server locally,
 - Install MySQL
 - PHP and configure it to work with Apache web server and MySQL.

5. Write an HTML page with Javascript that takes a number from one text field in the range 0-999 and display it in other text field in words. If the number is out of range ,it should show “out of range” and if it is not a number ,it should show “not a number” message in the result box.
6. Write an HTML page that has one input, which can take multi-line text and a submit button. Once the user clicks the submit button ,it should show the number of characters ,lines and words in the text entered using an alert message. Words are separated with white space and lines are separated with new line character.
7. Write an HTML page that contains a selection box with a list of 5 countries In the above page when the user selects a country, its capital should be printed next to the list, and add CSS to customize the properties of the font of the capital.
8. Create a php program to demonstrate the different predefined functions in Array and Math.
9. A user validation web application, where user submits the login name and password to server. These are checked against the data already available in database and if the data matches a successful login page is returned. Otherwise a failure message is shown to the user.
10. Create and save an XML document at the server, which contains 10 users information. Write a program which takes User Id as input and returns the user details by taking the user information from the XML document.
11. A web application takes a name as input and on submit it shows a hello page where is taken from the request and it shows a start time at the right top corner of the page and provides the logout button on clicking this button it should show a logout page with thank you message with the duration of Usage.
12. A web application that lists all cookies stored in the browser on clicking “list cookies” button, add cookies if necessary.
13. Create a table which should contain at least the following fields: name, password, email-id, phone number (these should hold the data from the registration form).
Write a PHP program to connect to that database and extract data from the tables and display them. Experiment with various SQL queries.

Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page

14. Write a PHP which does the following job:

Insert the details of the 3 or 4 users who register with the web site by using registration. Authenticate the user when he submits the login form using the user name and password from the database.

Text Books:

1. Beginning PHP and MySQL, 5th Edition, Jason Gilmore, Apress Publications (Dream tech.)
2. PHP 5 Recipes A problem Solution Approach Lee Babin, Nathan A Good, Frank M.Kromann and Jon Stephens.
3. Web Programming, building internet applications, Chris Bates 3rd edition, WILEY Dreamtech.
4. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.

Reference Books:

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware(Addison Wesley) Pearson Education.
2. PHP 5.1, I Bayross and S. Shah, The X Team, SPD
3. PHP and My SQL by Example, E. Quigley, Prentice Hall (Pearson).
4. PHP Programming solutions, V. Vaswani. TMH

Course Title	ADVANCED ENGLISH COMMUNICATION SKILLS LAB				B. Tech V Sem (R18) CSE			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1824512	HSC	L	T	P	C	Internal Assessment	End Exams	Total
		--	--	2	1	50	50	100
					End Exam Duration: 3Hrs			
Course Objectives:								
<ul style="list-style-type: none"> To focus on improving the student's proficiency in English at all levels. To train students to use language effectively to participate in group discussions, To help them face interviews and sharpen public speaking skills To enhance the confidence of the student by exposing him/her to various situations and contexts which he/she would face in his/her career. To make students industry-ready. 								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Describe various employability skills required for the employment.							
CO 2	Understand speaking and listening skills.							
CO 3	Analyze Behavioral skills.							
CO 4	Illustrate various kinds of reports and present them schematically.							
CO 5	Classify the verbal and non-verbal communication.							

1.Syllabus:

The following course content is prescribed for the Advanced Communication Skills Lab:

Functional English – Introduction --Starting & Responding a Conversation--Social Etiquette
Conversation -- role play – Body language in conversation—departure phrases.

Technical Report Writing --- Types of formats and styles, subject matter, organization, clarity, coherence and style, data-collection, tools, analysis

Resume' Writing --- Structure, format and style, planning, defining the career, objective, projecting one's strengths, and skills, creative self-marketing, cover letter.

Group Discussion--- Communicating views and opinions, discussing, intervening.Providing solutions on any given topic across a cross-section of individuals, (keeping an eye on modulation of voice, clarity, body language, relevance, fluency and coherence) in personal and professional lives.

Interview Skills --- Concept and process, pre-interview planning, mannerisms, body language, organizing, answering strategies, interview through tele and video-conferencing.

Technical Presentations (Oral) --- Collection of data, planning, preparation, type, style and format, use of props, attracting audience, voice modulation, clarity, body language, asking queries.

2. Minimum Requirements

The English Language Lab shall have two parts:

The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners.

The Communication Skills Lab with movable chairs and audio-visual aids with a P.A System, a TV, A digital stereo-audio and video system, Camcorder etc.

System Requirement (Hardware Component):

Computer network with LAN with a minimum of 60 multimedia systems with the following specifications:

P-IV Processor, Speed-2.8 GHz, RAM_512 MB minimum, Hard Disk-80 GB, Headphones

Prescribed Software: Walden and K-Van Solutions.

Text Books:

1. **Technical writing and professional communication, Huckin and Olsen** Tata McGraw-Hil 2009.
2. **Speaking about Science, A Manual for Creating Clear Presentations by Scott Morgan and Barrett Whitener, Cambridge University press, 2006.**
3. **Handbook for Technical Writing** by David A McMurrey& Joanne Buckely CENGAGE Learomg 2008.
4. **Technical Communication** by Meenakshi Raman &Sangeeta Sharma, Oxford University Press 2009.

Reference Books:

1. **The ACE of Soft Skills** by Gopal Ramesh and Mahadevan Ramesh, Pearson Education, 2010.
2. **Cambridge English for Job-Hunting** by ColmDownes, Cambridge Unicversity Press, 2008.
3. **Resume's and Interviews** by M. Ashraf Rizvi, Tata McGraw-Hill, 2008.
4. **From Campus to Corporate** by KK Ramachandran and KK Karthick, Macmillan PublishersIndia Ltd, 2010.
5. **English Language Communication: A Reader cum Lab Manual**Dr A Ramakrishna Rao, DrG Natanam& Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.
6. **Managing Soft Skills** by K R Lakshminarayan and T. Muruguvel, Sci-Tech Publications, 2010.
7. **Business Communication** by John X Wang, CRC Press, Special Indian Edition, 2008.

Course Title	SOCIAL RELEVANT PROJECT					B.Tech V Sem (R18) CSE		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1805513	PROJECT	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		-	-	4	2	100	-	100
Internal Evaluation								
Course Objectives:								
The objective of the project is to enable the student to take up investigative study in rural areas in the field of Computer Science and Engineering.								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Understand core concepts and research findings relative to human development, socialization, group dynamics and life course processes.							
CO 2	Identify and transfer existing ideas into new contexts and applications							
CO 3	Apply and transfer academic knowledge into the real-world							
CO 4	Design a component or a product applying all the relevant standards and with realistic constraints							

The following are the rules and regulation for **Socially Relevant Projects**:

1. The student has to spend 50 to 60 Hrs in the semester on any socially relevant project and submit a report for evaluation.
2. The project is evaluated for 100 marks in the semester by a committee consisting of head of the department, project mentor and one senior faculty member of the department.
3. A student shall acquire 2 credits assigned, when he/she secures 50% or more marks from the total of 100 marks.
4. In case, if a student fails, he/she shall resubmit the report.
5. There is no external evaluation for the socially relevant project.

R18-CSE- VI Semester

Course Title	INTERNET OF THINGS				B. Tech VI Sem (R18) CSE			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1805601	PCC	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs			
Course Objectives:								
<ul style="list-style-type: none"> • Basic principles of IOT. • Various IOT platforms and application development. • To know about Arduino board. • To know about Raspberry pi. 								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Demonstrate knowledge on Protocols, functional blocks and communication models of Internet of Things.							
CO 2	Identify domain specific IoT's.							
CO 3	Design appropriate solutions for IoT applications.							
CO 4	Working with Arduino board.							
CO 5	Design and develop applications using Raspberry pi device.							

UNIT - I

INTRODUCTION TO IoT:

Definition and Characteristics of IoT, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies, IoT Levels and Development Templates

UNIT - II

DOMAIN SPECIFIC IoTS:

Introduction, Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health & Lifestyle.

UNIT - III

IOT and M2M:

Introduction, M2M, Difference between IoT and M2M, SDN and NFV for IoT

IoT Platform Design Methodology:

Introduction, IoT Design Methodology, Case Study on IoT System for Weather Monitoring

UNIT - IV

Introduction to Arduino:

Introduction, The Arduino Way, The Arduino Platform, Getting started with Arduino, Advanced Input and Output, Sample Programs.

UNIT - V

IOT Physical Devices:

What is an IOT device, basic building blocks of an IOT device, Exemplary device: Raspberry Pi, about the board, linux on raspberry Pi, raspberry Pi interfaces, Programming Raspberry Pi with Python, Other IoT Devices.

Text Books:

1. Adrian McEwen, Hakin Cassimally “Designing the Internet of Things” Wiley India.
2. Getting Started with Arduino, 3rd Edition, Massimo Banzi and Michael Shiloh
3. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O’Reilly-2014.
4. Arshdeep Bahga, Vijay Madisetti “ Internet of Things(A hands on approach)” 1st Edition, VPI publications, 2014.

Reference Books:

1. Raj Kamal, “Internet of Things”, McGraw Hill, 1st Edition, 2016.
2. Internet of Things, Surya Durbha, Jyothi Joglekar, Oxford Higher Education.
3. The Internet of Things, Michael Miller, Pearson.
4. The Internet of Things, Samuel Greengard, The MIT Press Ltd.

Course Title	DATA MINING				B.Tech VI Sem (R18) CSE			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1805602	PCC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0				
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs			
Course Objectives:								
<ul style="list-style-type: none"> To learn the concepts of database technology evolutionary path which has led to the need for data mining and its applications To develop skills of using data mining techniques for solving practical problems. To learn Data mining algorithms to build analytical applications. 								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Understand the fundamentals of Data Mining and its Principles.							
CO 2	Understand different steps followed in Data mining and pre-processing for Data Mining.							
CO 3	Apply appropriate data mining algorithms to find Frequent patterns, Associations, and Correlations.							
CO 4	Compare and evaluate data mining techniques classification, prediction.							
CO 5	Cluster the high dimensional data for better organization of the data and to detect the Outliers in the high dimensional data.							

UNIT - I

Introduction: Why Data Mining? What Is Data Mining? What Kinds of Data Can Be Mined? What Kinds of Patterns Can Be Mined? Major issues in Data Mining.

UNIT - II

Data Preprocessing:

Why Pre-process the Data? Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation.

UNIT - III

Mining Frequent Patterns, Associations, and Correlations: Basic Concepts and Methods: Basic Concepts, Frequent Itemset Mining Methods, From Association Analysis to Correlation Analysis, Pattern Mining in Multilevel, Multidimensional Space, Constraint-Based Frequent Pattern Mining.

UNIT - IV

Classification:

Basic Concepts, Decision Tree Induction, Baye's Classification Method, Rule-Based Classification.

Prediction: Basic concepts, Accuracy and Error measures, Evaluating the accuracy of a classifier or a predictor.

UNIT - V

Cluster Analysis: Cluster Analysis basic concepts, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods.

Outlier Detection - Outliers and Outlier Analysis, Outlier Detection Methods

Text Books:

1. Data Mining: Concepts and Techniques, Jiawei Han , Micheline Kamber and Jian Pei, Morgan Kaufmann Publishers, Elsevier, Third Edition, 2012.
2. Data Warehousing in the Real world, Sam Aanhory & Dennis Murray , Pearson Education, Asia.
3. Intelligent Data Mining, Da Raun. Guoqing Chen, Etienne E. Kerre. Geert Wets, Springer.
4. Data Mining & Data Warehousing: Principles and Practical Techniques, Parteek Bhatia, Cambridge.

Reference Books:

1. Data Mining Techniques, Arun K Pujari, Second Edition, Universities Press.
2. Insight into Data Mining, K.P.Soman, S.Diwakar , V.Ajay, PHI 2008.
3. Data Mining: Introductory and Advanced Topics, Margaret H. Dunhan, Pearson.
4. Data Mining, Vikram Pudi, P. Radha Krishna, Oxford Higher Education.

Course Title	ARTIFICIAL INTELLIGENCE (Professional Elective-2)				B.Tech VI Sem (R18) CSE			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1805603	PEC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs			
Course Objectives:								
<ul style="list-style-type: none"> To understand how a computer making intelligent decisions. To understand the notions of state space representation, heuristic search methods. To learn different knowledge representation techniques To understand the applications of AI. 								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Possess the ability to formulate an efficient problem space for a problem.							
CO 2	Possess the ability to select a search algorithm for a problem.							
CO 3	Possess the skill for representing knowledge using the appropriate technique							
CO 4	Enable Artificial Intelligence role in different domains							

UNIT - I

Introduction to AI: AI Problems History what is an AI Technique. Problem, Problem Space and Search, Heuristic Search techniques.

UNIT - II

Knowledge Representation Issues, Predicate Logic, Knowledge Representation using rules.

UNIT - III

Symbolic reasoning under Uncertainty, Bayesian Networks.

UNIT - IV

Weak Slot Filler Structures, Strong Slot and Filler Structures, Knowledge Representation summary.

UNIT – V

Game Playing, Planning, Natural Language processing.

Text Books:

1. Rich, Knight, Nair: Artificial intelligence, Tata McGraw Hill, Third Edition 2009.
2. SarojKaushik. Artificial Intelligence. Cengage Learning, 2011.
3. Russell, Norvig: Artificial intelligence, A Modern Approach, Pearson Education, Second Edition. 2004.
4. Artificial Intelligence, George F Luger, 6th Edition, Pearson.

Reference Books:

1. Introduction Artificial Intelligence and Experts Systems, Dan W. Patterson, Pearson.
2. Artificial Intelligence, ELA Kumar, Wiley.
3. Artificial Intelligence: A Guide to Intelligent Systems, Michael Negnevitsky, Pearson.

Course Title	SOFTWARE TESTING (Professional Elective-2)				B.Tech VI Sem (R18) CSE			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1805604	PEC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0				
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs			
Course Objectives:								
<ul style="list-style-type: none"> • Study the concepts of Software Testing objectives, Complications of bugs and Types of bugs. • Learn various testing methodologies. • Identify the techniques and skills on how to use modern software testing tools to support software testing projects. 								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Recall Software Testing.							
CO 2	Compare various Terminologies used in Software Testing.							
CO 3	Understand various testing methodologies like Path Testing, Domain Testing, Logic based Testing and Tools (Winrunner testing Tool).							
CO 4	Construct various graphs useful in Software Testing like Flow Graph, State Graph.							
CO 5	Examine various testing strategies and categorize them.							

UNIT - I

Introduction: Purpose of testing, Dichotomies, Model for testing, Consequences of

Bugs, Taxonomy of bugs.

Flow graphs and Path testing: Path testing basics, Predicates, Path Predicates and Achievable Paths, Path Sensitizing, Path Instrumentation, Application of path testing.

UNIT - II

Transaction Flow Testing: Transaction Flows, Transaction Flow Testing Techniques.

Dataflow testing: Basics of dataflow testing, Strategies in dataflow testing, Application of dataflow testing.

UNIT - III

Domain Testing: Domains and Paths, Nice & Ugly Domains, Domain Testing, Domains and Interfaces Testing, Domains and Testability.

Paths, Path products and Regular expressions: Path products & Path expression, Reduction Procedure, Regular Expressions & Flow Anomaly Detection.

UNIT - IV

Logic Based Testing: Overview, Decision Tables, and Path Expressions, KV charts, and specifications

State, State Graphs and Transition Testing: State Graphs, Good & Bad State Graphs, State Testing, Testability Tips.

UNIT - V

Graph Matrices and Application: Matrix of Graph, Power of a Matrix, Node Reduction Algorithm, Building Tool.

Text Books:

1. Software Testing techniques, Boris Beizer, Dreamtech, Second Edition.
2. Software Testing, N.Chauhan, Oxford University Press.
3. The craft of software testing - Brian Marick, Pearson Education.
4. Foundations of Software Testing, D.Graham and Others, Cengage Learning.

Reference Books:

1. Software Testing, Third Edition, P.C.Jorgensen, AurbachPublications (Dist.by SPD).
2. Introduction to Software Testing, P.Ammann and J.Offutt, Cambridge Univ. Press.
3. Effective methods of Software Testing, Perry, John Wiley, Second Edition, 1999.
4. Software Testing Concepts and Tools, P.Nageswara Rao, Dreamtech Press.
5. Software Testing, M.G.Limaye, TMH.
6. Software Testing Tools, Dr.K.V.K.K.Prasad, Dreamtech.
7. Software Testing, Desikan, G.Ramesh, Pearson.
8. Foundations of Software Testing, A.P.Mathur, Pearson.

Course Title	MOBILE ADHOC NETWORKS (Professional Elective-2)				B.Tech VI Sem (R18) CSE			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1805605	PEC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs			
Course Objectives:								
<ul style="list-style-type: none"> • To understand the concept of Adhoc Networks • To understand the routing mechanism in Adhoc networks • To understand the role of security at different layers To understand the quality issues in Adhoc networks. 								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Compare the differences between cellular and ad hoc networks and the analyse the challenges at various layers and applications.							
CO 2	Summarize the protocols used at different layers and scheduling mechanisms.							
CO 3	Compare and analyze types of routing protocols used for unicast and multi cast routing.							
CO 4	Examine the network security solution and routing mechanism.							

UNIT - I

INTRODUCTION TO MOBILE ADHOC NETWORKS:

Network Deployment, Structured Versus Randomized Deployment, Network Topology, Topology Control, Connectivity in Geometric Random Graphs, Connectivity using Power Control and Mobility Models.

UNIT - II

LOCALIZATION AND TIME SYNCHRONIZATION PROTOCOLS:

Localization: protocols Approaches, Coarse- Grained Node Localization using Minimal Information, Fine-Grained Node Localization using Detailed Information-Network-Wide Localization-Theoretical Analysis of Localization Techniques

Time Synchronization Protocols: Traditional Approaches, Coarse-Grained Clock Synchronization, Fine-Grained Clock Synchronization.

UNIT - III

ROUTING PROTOCOLS:

Challenges and Issues, DSDV, DSR, AODV Protocols, Link Reversal Routing, Properties, Unicast and Multicast Route Establishment, Comparison of Multicast Routing Protocols, Scheduling Techniques, Transmission Scheduling, Medium Access and Sleep Scheduling.

UNIT - IV

TRANSPORT LAYER AND SECURITY PROTOCOLS:

Transport Layer Protocols: Design Goals, Issue in Designing a Transport Layer Protocol, Classification of Transport Layer Solutions, TCP over MANET.

Security Protocols: Security over MANET, Security Requirements, Issue and Challenges in Security Provisioning, Network Security Attacks, Security Routing in MANET.

UNIT - V

QoS ENERGYMANAGEMENT:

Issues and Challenges in Providing QoS in MANET, Classification of QoS Solutions, MAC Layer and Network Layer Solutions, QoS Frameworks, Need for Energy Management, Classification, Battery Management Scheme, Transmission Power and System Power Management Scheme.

Text Books:

1. Toh.C.K, "Ad Hoc Mobile Wireless Networks: Protocols and Systems", Prentice Hall PTR, 2001
2. Xiuzhen Cheng, Xiao Huang, Ding Zhu Du, "Ad Hoc Wireless Networking", Springer Netherlands, 2004
3. Charles E Perkins, "Ad Hoc Networking", Addison Wesley, 2001
4. Sivaram Murthy. Cand B S Manoj, "Ad Hoc Wireless Networks: Architecture and Protocols", Prentice Hall PTR, 2004

Reference Books:

1. Tavli, Bulent, Heinzelman, Wendi, "Mobile Ad Hoc Networks: Energy-Efficient Real-Time Data Communications", Springer, 2006
2. Aggelou, George, "Mobile Ad Hoc Networks: From Wireless LANs to 4g Networks", McGraw-Hill Professional Engineering, 2004.
3. Mobile Ad Hoc Networking: The Cutting Edge Directions, Stefano Basagni Marco Conti Silvia Giordano, 2nd Edition, Wiley India.

Course Title	MANAGEMENT SCIENCE				B.Tech VI Sem (R18) CSE			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1825609	HSMC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs			
Course Objectives:								
<p>The objective of the course is to learn basic understanding of management science including analytical problem solving and communications skills, Prepare for practice in a field that sees rapid changes in tools, problems and opportunities, Prepare for graduate study and self-development over an entire career, Provide ability to use the techniques, skills and modern engineering tools necessary for engineering practices, The broad education necessary to understand the impact of engineering solutions in a global and societal context, Background necessary for admission to top professional graduate engineering or business programs.</p>								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Know the principles and functions of management.							
CO 2	Understand the various concepts, approaches and theories of management in the real situation.							
CO 3	Compare and contrast organization structure designs and charts diligently with theoretical learning concepts.							
CO 4	To be aware of the role, functions and functioning of human resource department of the organizations.							
CO 5	Understand and Analyze the latest and contemporary developments in the field of management							
CO 6	Analyze the concept of strategic planning and implementation and apply on the decisions in strategic management.							

UNIT - I

Introduction to Management: Concept of Management: Administration – Organization - Functions of Management - Evolution of Management Thought -Henry Fayol, FW Taylor, Maslow’s Theory, Theory X and Theory Y and Contingency Theory. Organization: Principles of Organization – Types - Organization charts-managerial objectives and Social responsibilities of Management.

UNIT - II

Strategic Management: Corporate Planning-mission, objectives, strategy and programmes -SWOT Analysis- Strategy Formulation and Implementation.-Plant location and Plant Layout concepts.

UNIT - III

HRM and Inventory Management: Human Resource Management –Basic functions of HRM, Manpower Planning Job Evaluation and Merit Rating - Incentive plans.

Inventory Management: Need for Inventory Control; EOQ, ABC Analysis, Purchase Procedure.

UNIT - IV

Operations Management: Productivity- Job, Batch and Mass Production-Work Study-Basic procedure involved in Method Study and Work Measurement. Statistical Quality Control : c - chart, p - chart, R – chart - Acceptance sampling - Deming's contribution to Quality

UNIT - V

PROJECT MANAGEMENT:

Network Analysis to project management- PERT/CPM- Application of network techniques to engineering problems-Cost Analysis-Project Crashing.

Text Books:

1. Koontz & Weihrich: Essentials of Management, 6/e, TMH, 2005
2. Kanishka Bedi: Production and Operations Management, Oxford University Press, 2004.
3. Parnell: Strategic Management, Biztantra, 2003.
4. LS Srinath: PERT/CPM, Affiliated East-West Press, 2005.

Reference Books:

- 1 Industrial Engineering management science :Banga T Rshama SC Agarwal N K, Cambridge
- 2 Management science: Kumthekar MM hukeri Nand Kumar ,EP
- 3 Practical management science:Winston Wayne Lchristian Albrought SBroadie mark,Cengage
- 4 management science,Logistics ,and operation research; John wang(montclair state university,USA),IGI

Course Title	MOBILE APPLICATION DEVELOPMENT				B.Tech VI Sem (R18) CSE			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1805608	PCC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs			
Course Objectives:								
<ul style="list-style-type: none"> To Understand fundamentals of android operating systems. To learn the internals of the Android OS. To learn the Mobile application development using the Android SDK. 								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Identify various concepts of mobile programming that make it unique from programming for other platforms.							
CO 2	Critique mobile applications on their design pros and cons.							
CO 3	Utilize rapid prototyping techniques to design and develop sophisticated mobile Interfaces.							
CO 4	Program mobile applications for the Android operating system that use basic and advanced phone features.							
CO 5	Deploy applications to the Android marketplace for distribution.							

UNIT – I

Introduction to Android: The Android Platform, Android SDK, Eclipse Installation, Android Installation, Building you First Android application, Understanding Anatomy of Android Application, Android Manifest file. Using the Text view Control, Using the Android Emulator, The Android Debug Bridge (ADB), Launching Android Applications on a Handset.

UNIT - II

Basic Widgets: Understanding the Role of Android Application Components, Understanding the Utility of Android API, Overview of the Android Project Files, Understanding Activities, Role of the Android Manifest File,

Android User Interface Design Essentials: User Interface Screen elements, Designing User Interfaces with Layouts, Drawing and Working with Animation, Event Handling, Displaying Messages Through Toast, Creating and Starting an Activity, Using the Edit Text Control, Choosing Options with Checkbox, Choosing Mutually Exclusive Items Using Radio Buttons.

UNIT - III

Building Blocks for Android Application Design: Introduction to Layouts, Adapting to Screen orientation. Utilizing Resources and Media: Resources, Creating Values Resources, Using Drawable Resources, Switching States with Toggle Buttons, Creating an Images Switcher Application, Scrolling Through Scroll View, playing Audio, Playing Video, Displaying Progress with Progress Bar.

UNIT - IV

Selection widgets and Debugging: Introduction to Views, Using the Spinner control, Creating an Image Gallery Using the ViewPager Control, Using the Debugging Tool: Dalvik Debug Monitor Service(DDMS), Debugging Application, Using the Debug Perspective. Displaying And Fetching Information Using Dialogs and Fragments: Selecting the Date and Time in One Application, Fragments, Creating Fragments with java Code, Creating Special Fragments.

UNIT – V

Building Menus and Storing Data: Creating Interface Menus and Action Bars, Menus and Their Types, Creating Menus Through XML, Creating Menus Through Coding, Applying a Context Menu to a List View, Using the Action Bar, Replacing a Menu with the Action Bar, Creating a Tabbed Action Bar, Creating a Drop-Down List Action Bar. Using Databases: Accessing Databases with the ADB, Creating a Data Entry Form

Text Books:

1. Android Programming by B.M Harwani, Pearson Education, 2013.
2. T1. Lauren Darcey and Shane Conder, “Android Wireless ApplicationDevelopment”, Pearson Education, 2nd ed. (2011)
3. Android application Development for Java Programmers, James C Sheusi, Cengage Learning
4. Android In Action by W.Frank Ableson, Robi Sen, Chris King, C. EnriqueOrtiz.,Dreamtech.

Reference Books:

1. Beginning Android 4 Application Development, by Wei-Meng Lee , Wiley India.
2. Android Programming for Beginners, John Horton, 2nd Edition, Packt.
3. Android App Development for Dummies, Michael Burton, 3rd Edition, Wiley.

Course Title	INTERNET OF THINGS LAB				B.Tech VI Sem (R18) CSE			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1805609	PCC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		0	0	2	1	50	50	100
					End Exam Duration: 3Hrs			
Course Objectives:								
<ul style="list-style-type: none"> • Student should get the knowledge of Python and Eclipse background. • Student should get the knowledge of Control statements in python • Student should get the knowledge of Arduino. • Student should get the knowledge of Raspberry Pi 								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Student will be aware of Python and Eclipse background.							
CO 2	Student will develop basic programs in python							
CO 3	Student will get knowledge on Arduino IDE and Arduino Board							
CO 4	Student will get knowledge on Raspberry Pi							

IoT EXPERIMENTS

1. Study and Install IDE of Arduino and different types of Arduino
2. Digital Output (Blinking of LED)
3. Digital Input (Push Button)
4. Analog Output (Fading)
5. Communication between Computer and Arduino.
6. Displaying messages on LCD
7. Traffic Controller
8. Night Light Simulation using LDR and PVR
9. Fire Alert.
10. Color Recognition.
11. Study and Configure Raspberry Pi
12. Write a Program for LED blink using Raspberry Pi

Text Books:

1. Adrian McEwen, Hakin Cassimally “Designing the Internet of Things” Wiley India.
2. Getting Started with Arduino, 3rd Edition, Massimo Banzi and Michael Shiloh
3. Getting Started with Raspberry Pie, Matt Richardson & Shawn Wallace, O’Reilly-2014.
4. Arshdeep Bahga, Vijay Madisetti “ Internet of Things(A hands on approach)” 1st Edition, VPI publications, 2014.

Reference Books:

1. Raj Kamal, “Internet of Things”, McGraw Hill, 1st Edition, 2016.
2. Internet of Things, Surya Durbha, Jyothi Joglekar, Oxford Higher Education.
3. The Internet of Things, Michael Miller, Pearson.
4. The Internet of Things, Samuel Greengard, The MIT Press Ltd.

Course Title	MOBILE APPLICATION DEVELOPMENTLAB				B.Tech VI Sem (R18) CSE			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1805610	PCC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		0	0	2	1	50	50	100
					End Exam Duration: 3Hrs			
Course Objectives:								
<ul style="list-style-type: none"> • To understand fundamentals of android operating systems. • Illustrate the various components, layouts and views in creating android applications. • To understand fundamentals of android programming. 								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Develop applications using services and publishing android applications.							
CO 2	To demonstrate their skills of using Android software development tools.							

LIST OF EXPERIMENTS

1. Setting up the Development Environment
 - 1.1 Installation of JDK and Setting path
 - 1.2 Downloading and Installing Android Studio
2. Creating "Hello World" Application and viewing the output through emulator.
3. Creating the Application by using Activity class
 - i) onCreate()
 - ii) onStart()
 - iii) onResume()
 - iv) onPause()
 - v) onStop()
 - vi) onDestroy()
 - vii) onRestart()
4. Create the Application using the Edit Text control.

5. Create the Application Choosing options.

i) CheckBox

ii) RadioButton

iii) Spinner

6. Create the applications using different layouts.

i) Linear Layout

ii) Relative Layout

iii) Absolute

Layoutiv)Table

Layout

7. Create the application for doing arithmetic operations. (Calculator)

8. Create the application to play the audio and video clips.

9. Create the application by using menus and action bar.

Text Books:

1. Android Programming by B.M Harwani, Pearson Education, 2013.
2. T1. Lauren Darcey and Shane Conder, "Android Wireless ApplicationDevelopment", Pearson Education, 2nd ed. (2011)
3. Android application Development for Java Programmers, James C Sheusi, CengageLearning
4. Android In Action by W.Frank Ableson, Robi Sen, Chris King, C. EnriqueOrtiz.,Dreamtech.

Reference Books:

1. Beginning Android 4 Application Development, by Wei-Meng Lee , Wiley India.
2. Android Programming for Beginners, John Horton, 2nd Edition, Packt.
3. Android App Development for Dummies, Michael Burton, 3rd Edition, Wiley.

Course Title	INTERNSHIP				B.Tech VI Sem (R18) CSE			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1805611	PROJECT	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		--	--	--	2	100	--	100
Internal Assessment								
Course Objectives:								
<ul style="list-style-type: none"> • Develop and improve business skills in communication, technology, quantitative reasoning, and teamwork. • Observe and participate in business operations and decision-making. • Meet professional role models and potential mentors who can provide guidance, feedback, and support. 								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Assess interests and abilities in their field of study and Integrate theory and practice.							
CO 2	Develop communication, interpersonal and other critical skills in the job interview process.							
CO 3	Acquire employment contacts leading directly to a full-time job following graduation from college.							
CO 4	Identify and carry out performance objectives related to their job assignment.							

Semester 6: (Open Elective-1)

S.No	Subject Code	Subjects	L	T	P	C R
1	18OE501 18OE502	<u>Open Elective-1:</u> 1. Data Structures 2. Database Management Systems	3	0	0	3
		Total	3	0	0	3

Course Title	DATA STRUCTURES (Open Elective-1)				B.Tech VI Sem (R18)			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
18OE501	OEC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs			
Course Objectives:								
<ul style="list-style-type: none"> To develop skills and analyze linear and nonlinear data structures. To understand basic concepts about linked lists, stacks, queues. To study algorithms as they apply to trees and graphs. To study in detail about sorting. 								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Understand the variety of abstract data types and data structures.							
CO 2	Analyze data structures such as linked list, Stacks and Queues.							
CO 3	Apply and analyze tree traversal algorithms and graph traversal algorithms.							
CO 4	Organize data in order using various sorting algorithms.							

UNIT - I

Introduction: Data structures, Primitive & Non Primitive data structures, Linear & Non Linear data structures, **Linear Lists:** Definition, **Arrays:** Definition, **Linked Lists:** Single Linked List-Definition, Insertion and Deletion operations, Doubly Linked List- Definition, Insertion and Deletion operations.

UNIT - II

Stacks: Definition, Array & Linked representations, Operations, Applications, **Queues:** Definition, Array & Linked representations, Operations, Circular Queues & Dequeues.

UNIT - III

Trees: Basic terminology, Binary Trees- Definition, Properties, Representation, Complete and Full Binary Tree, **Tree Traversal Algorithm:** Inorder, Preorder and Postorder, **Priority Queues:** Definition, Heaps, Leftist Trees, **Binary Search Tree(BST):** Definition, Operations & Implementations, Indexed BST.

UNIT - IV

Balanced Search Trees: AVL, Red-Black & Splay Trees, Graphs: Terminology, Representations, **Graph Traversal:** Depth First Search (DFS), Breadth First Search (BFS),

UNIT - V

Sorting: Selection, Insertion, Bubble, Heap, Quick Sort, Merge Sort, **Searching:** Linear and Binary search

Text Books:

1. An Introduction to Data Structures with applications, Jean Paul Trembley and Paul G.Sorenson, McGraw Hill.
2. Fundamentals of Data Structures in C, Horowitz, Sahni, Anderson Freed, Universities press.
3. Data Structures using C++, Varsha H.Patil, Oxford University Press.
4. Data Structures, Seymour Lipschutz, Schaum's Outlines, McGraw Hill.

Reference Books:

1. Data Structures, Algorithms and Applications in C++, AnandaRaoAkepogu and Radhika RajuPalagiri, Pearson Education.
2. Data Structures and Algorithms in C++, S.Sahni, University Press (India) Private Limited, Second Edition.
3. Data Structures and Algorithms, G.A.V.Pai, Tata McGraw Hill.
4. Data Structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.

Course Title	DATABASE MANAGEMENT SYSTEMS (Open Elective-1)				B.Tech VI Sem (R18)			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
18OE502	OEC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs			
Course Objectives:								
<ul style="list-style-type: none"> To understand and successfully apply logical database design principles, including E-R diagrams and database normalization. To understand the role of a database management system in an organization. To understand basic database concepts, including the structure and operation of the relational data model. Construct simple and moderately advanced database queries using Structured Query Language (SQL). 								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	To Use Structured Query Language (SQL) for database manipulation.							
CO 2	To Identify, analyze and define database objects, enforce integrity constraints on a database using RDBMS.							
CO 3	To Design and build simple database systems.							
CO 4	To Develop application to interact with databases.							

UNIT - I

Introduction - Database-System Applications, Purpose of Database Systems, View of Data, Database languages, Data base architecture, Database Users and Administrators.

Introduction to the Relational Model - Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations.

Database Design and the E-R Model - Overview of the Design Process, The Entity Relationship Model, Constraints, Removing Redundant Attributes in Entity Sets, Entity Relationship Diagrams.

UNIT - II

Introduction to SQL - Overview of the SQL Query Language, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Sub queries, Modification of the Database.

Advanced SQL - Integrity Constraints, SQL Data Types and Schemas, and Procedures, Triggers.

UNIT - III

Schema Refinement and Normal Forms - Schema Refinement – Problems Caused by Redundancy, Decompositions, Problems related to decomposition. Reasoning about Functional Dependencies, First, Second, Third Normal forms, BCNF. Lossless join Decomposition, Dependency- preserving Decomposition. Schema refinement in Data base Design, Multi valued Dependencies, Fourth Normal Form, Join Dependencies, Fifth Normal Form, Inclusion dependencies.

UNIT - IV

Query Processing and Optimization- Overview, Measures of Query Cost, Transformation of Relational Expressions.

Transactions - Transaction Concept, A Simple Transaction Model, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Transaction Isolation and Atomicity, Transaction Isolation Levels, Implementation of Isolation Levels, Transactions as SQL Statements.

UNIT - V

Concurrency Control - Lock-Based Protocols, Deadlock Handling, Multiple Granularity, Timestamp-Based Protocols, Validation-Based Protocols, Multi version Schemes, Snapshot Isolation, Insert Operations, Delete Operations, and Predicate Reads.

Text Books:

1. Silberschatz, Korth, Database System Concepts. 5th Edition, McGraw Hill.
2. Raghurama Krishnan, Johannes Gehrke, Database Management Systems. 3rd Edition, Tata McGraw Hill.
3. Elmasri, Navathe, Fundamentals of Database Systems, Pearson Education.
4. C.J. Date, Introduction to Database Systems

Reference Books:

1. Peter Rob, Ananda Rao and Carlos Corone, Database Management Systems, Cengage Learning.
2. Ramez Elmasri, Shamkanth B. Navathe, Fundamentals of Database Systems, 7th Edition, Pearson.
3. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Database System Concepts, Indian Edition, McGraw Hill.