GOVERNMENT OF INDIA
MINISTRY OF
PARLIAMENTARY AFFAIRS

Azadi Ka Amrit Mahotsav

mygov मेरी सरकार

PREAMBLE TO THE CONSTITUTION

PREAMBLE

WE, THE PEOPLE OF INDIA,

having solemnly resolved to constitute India into a SOVEREIGN SOCIALIST SECULAR DEMOCRATIC **REPUBLIC** and to secure to all its citizens:

JUSTICE, social, economic and political;

LIBERTY of thought, expression, belief, faith and worship;

EQUALITY of status and of opportunity;

and to promote among them all

FRATERNITY assuring the dignity of the individual and the unity and integrity of the Nation;

IN OUR CONSTITUENT ASSEMBLY this 26th day of November, 1949, do HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.

I have read the Preamble

[redacted]

Signature

23-01-2022

SRI SIDDHARTHA ACADEMY OF HIGHER EDUCATION

("Deemed to be University u/s 3 of the UGC Act, 1956")

Accredited 'A+' Grade by NAAC

Agalakote, B.H.Road, Tumkur – 572 107.KARNATAKA, INDIA.

No. SSAHE/ACA-S&C/ 18/UG(BE)/2024 Date: 15/07/2024

N O T I F I C A T I O N

Sub: - Ordinance pertaining to Curriculum of Undergraduate Programme Bachelor of Engineering (3rd Year Computer Science and Engineering)

Ref: Proceedings of the Academic Council meeting held on 10/07/2024 vide agenda No. SSAHE/AC/XXVIII-12/2024

In exercise of the powers vested under section 6 of 6.05 of MoA / Rules of SSAHE, the Revised Ordinance pertaining to Curriculum of Undergraduate Programme Bachelor of Engineering (3rd Year Computer Science and Engineering) is notified herewith as per Annexure.

By Order,

REGISTRAR

REGISTRAR
Sri Siddhartha Academy of Higher Education
TUMKUR - 572 107, Karnataka.

To,
Dean / Principal, Sri Siddhartha Institute of Technology,

Copy to

1) Office of the Chancellor, SSAHE, for kind information,
2) PA to Vice-Chancellor / PA to Registrar / Controller of Examinations / Finance Officer, SSAHE
3) All Officers of the Academy Examination Branch / Academic Section
4) Guard File / Office copy.

S.S.A.H.E TUMKUR

SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY- TUMAKURU

(A constituent College of Siddhartha Academy of Higher Education, Tumakuru)

Academic year 2024-2025

Department of Computer Science and Engineering

Scheme of Teaching and Examination (160 Credits Scheme, NEP Batch)

5th Semester B.E. **Effective from the Academic year 2024-25**

SI No	Course Code		Course Title	Teaching Dept.	L	T	P	Credits	CIE Marks	SEE Marks	Total Marks	Exam Hrs
1	PC	22CS501	Database Management System	CS	3	-	-	3	50	50	100	3
2	PC	22CS502	Machine Learning Techniques	CS	3	-	2	4	50	50	100	3
3	PC	22CS503	Computer Networks	CS	3	-	2	4	50	50	100	3
4	PE	22CS5PE4x	Professional Elective-I	CS	3	-	-	3	50	50	100	3
5	OE	22CS5OE5x	Open Elective-I	CS	3	-	-	3	50	50	100	3
6	HS	22IE56X	Institutional Elective (561:Research Methodology,562:Management and Enterpreneurship,563:Project Management)	XX	2	-	-	2	50	50	100	3
7	PC	22CS507	Dept. Skill Lab-3 (Enterprise Lab)	CS	1	-	2	2	50	50	100	3
8	HS	22SK508	Skill Development-II	T&P	-	-	2	1	50	-	50	-
L: Lecture, T-Tutorial, P-Practical/Drawing, CIE: Continuous Internal Evaluation, SEE: Semester End Examination				**Total**	**18**	**-**	**8**	**22**	**400**	**350**	**750**	--

Credits Distribution: Basic Science (BS)=08+08+3+3=22, Engineering Science (ES)=10+11=21, Humanities & Social Sciences (HS)=1+2+2+1=6, Program Core (PC)=02+16+16+15=49, Program Elective (PE)=03, Open Elective(OE)=03, Total Credits=20+20+21+21+22=104

Professional Elective-I

22CS5PE41: UNIX System Programming

22CS5PE42: Advanced Data Structures and Algorithms

22CS5PE43: J2EE

Open Elective-I

22CS5OE51: Data Structure and Algorithms

22CS5OE52: DBMS

Institutional Elective

22IE561: Research Methodology

22IE562: Management and Entrepreneurship

22IE563 Project Management

SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY- TUMAKURU

(A constituent College of Siddhartha Academy of Higher Education, Tumakuru)

Academic year 2024-2025

Department: Computer Science and Engineering			**Semester:**	**V**
Subject: Database Management System				
Subject Code:	**22CS501**		**L – T – P - C:**	**3- 0- 0-3**

Sl. No	Course Objectives
1	Knowledge of the architecture and functioning of Database Management Systems.
2	Understand and apply the principles of data modeling using Entity Relationship and develop a good database design.
3	Understand the use of Structured Query Language (SQL) and NoSQL
4	Apply normalization techniques to normalize a database and understand the need of database transaction.

Unit	Description	Hrs
I	**Introduction :** Introduction, An example, Characteristics of Database approach, Actors on the scene, Workers behind the scene, Advantages of using DBMS approach, A brief history of database applications, when not to use a DBMS. Data models, schemas and instances, Three schema architecture and data independence, Database languages and interfaces, The database system environment, Centralized and client-server architectures, Classification of Database Management systems.	**8**
II	**Data Modeling using the Entity-Relationship (ER) Model:** Using High-Level Conceptual, Data Models for Database Design, An Example Database Application, Entity Types, Entity Sets, Attributes and Keys, Relationship types, Relationship Sets, Roles and Structural Constraints, Weak Entity Types, Refining the ER Design, ER Diagrams, Naming Conventions and Design Issues, Relationship types of degree higher than two. Relational Database Design, Using ER- to-Relational Mapping. Relational Model : Relational Model Concepts, Relational Model Constraints and Relational Database Schemas, Update Operations, Transactions and dealing with constraint violations.	**8**
III	**SQL** : Data Definition and Data Types, Specifying constraints in SQL, Basic queries in SQL, Insert, Delete and Update statements in SQL, More complex SQL Queries,Views (Virtual Tables) in SQL, Schema change statements in SQL. **Introduction to NoSQL (Not Only SQL):** Where is it used? , what is it?, Types ofNoSQL databases, Why NoSQL?, Advantages of NoSQL, What we miss with NoSQL?, use of NoSQL in industry, NoSQL vendors, SQL versus NoSQL, NewSQLIntroduction, Comparison of SQL, NoSQL and NewSQL	**8**
IV	**Database Design:** Informal Design Guidelines for Relation Schemas, Functional Dependencies, Normal Forms Based on Primary Keys, General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form.	**8**
v	**Transaction Management**: The ACID Properties, Transactions and Schedules, Concurrent Execution of Transactions, Lock- Based Concurrency Control, Dealing with Deadlocks, Transaction support in SQL. Introduction to ARIES and Write –Ahead Log protocol..	**8**

Course Outcomes:

Course outcome	Descriptions
CO1	Gain the concepts of database management system.
CO2	Design database using conceptual and relational model.
CO3	Illustrate various DBMS commands using SQL and NoSQL
CO4	Apply normalization and comprehend transaction management in Relational database.

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**2**											**1**		
CO2	**3**	**3**	**3**	**2**							**2**	**3**		
CO3	**3**	**3**	**3**	**3**	**2**							**3**		
CO4	**1**			**2**								**2**		

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Fundamentals of Database Systems	Elmasri and Navathe	7th Edition, Pearson Education, 2017, ISBN-13: 978-9332582705.
2	Big data And Analytics	Seema Acharya, Subhashini Chellappan, Infosys Limited	Publication Wiley India Private Limited, 1st Ed 2015. ISBN:978-81-265-5478-2

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Database Management Systems	Raghu Ramakrishnan and Johannes Gehrke	3rd Edition, McGraw-Hill, 2014, ISBN-13:978-9339213114.
2	An Introduction to Database Systems	C.J. Date, A. Kannan, S. Swamynatham	8th Edition, Pearson education,2017, ISBN-13:978-817585568.

Signature of the course coordinator **Signature of the HoD** **Signature of the Dean (Academic Affairs)**

SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY- TUMAKURU

(A constituent College of Siddhartha Academy of Higher Education, Tumakuru)

Academic year 2024-2025

Department: Computer Science and Engineering			**Semester:**	**V**
Subject: Machine Learning Techniques				
Subject Code:	**22CS502**		**L – T – P - C:**	**3 – 0– 2– 4**

Sl. No	Course Objectives
1	Understand the fundamentals of Machine Learning concepts.
2	Learn the field of Machine Learning, describing a variety of learning paradigms, algorithms, theoretical results, and applications.
3	Study the basics of supervised and unsupervised learning.
4	Illustrate ML algorithms and their use in appropriate applications.

Unit	Description	Hrs
I	**Introduction to Machine Learning** What is machine learning? What kind of problems can be tackled using machine learning, A Simple Machine-Learning Task: Training Sets and Classifiers, Minor Digression: Hill-Climbing Search, Hill Climbing in Machine Learning, Some Difficulties with Available Data **Bayesian Classifiers** The Single-Attribute Case, Vectors of Discrete Attributes, Probabilities of Rare Events: Exploiting the Expert's Intuition,	**8**
II	**Bayesian Classifiers contd..** How to Handle Continuous Attributes, Gaussian "Bell" Function: A Standard pdf, Approximating PDFs with Sets of Gaussians. **Nearest-Neighbor Classifiers** The k-Nearest-Neighbor Rule, Measuring Similarity, Irrelevant Attributes and Scaling Problems, Performance Considerations, Weighted Nearest Neighbors, Removing Dangerous Examples,	**8**
III	**Linear and Polynomial Classifiers** The Essence, The Additive Rule: Perceptron Learning, The Multiplicative Rule: WINNOW, Domains with More Than Two Classes, Polynomial Classifiers, Specific Aspects of Polynomial Classifiers, Numerical Domains and Support Vector Machines. **Artificial Neural Networks** Multilayer Perceptrons as Classifiers, Neural Network's Error, Backpropagation of Error, Special Aspects of Multilayer Perceptrons, Architectural Issues.	**8**
IV	**Decision Trees** Decision Trees as Classifiers, Induction of Decision Trees, How Much Information Does an Attribute Convey?, Binary Split of a Numeric Attribute, Pruning, Converting the Decision Tree into Rules.	**8**

	Unsupervised Learning Cluster Analysis, A Simple Algorithm: k-Means,	
v	**Unsupervised Learning contd..** More Advanced Versions of k-Means, Hierarchical Aggregation. Performance Evaluation Basic performance criteria, precision and Recall, Other ways to measure Performance, Learning curves, Learning computational costs, Methodologies of Experimental Evaluation..	**8**

LAB CONTENT

Sl. No.	Experiment Description
1.	Experiment to demonstrate Naïve Bayesian Classifier.
2.	Experiment to demonstrate K-Nearest Neighbor Algorithm.
3.	Experiment to demonstrate Back propagation Algorithm.
4.	Experiment to demonstrate Decision Trees.
5.	Experiment to demonstrate K-means clustering.
6.	Experiment to demonstrate Linear Classifier.
7.	Experiment to demonstrate Polynomial Classifier.

Course Outcomes:

Course outcome	Descriptions
CO1	Interpret the ideas and facts of Machine Learning algorithms applied in specific domain
CO2	Describe various supervised and unsupervised machine learning algorithm
CO3	Illustrate the working of ML Algorithms
CO4	Compare and analyze the performance of classifiers

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**3**	**3**	**3**									**2**	**3**	**3**
CO2	**3**	**3**	**3**	**2**								**3**	**3**	**3**
CO3	**3**	**3**	**3**	**3**	**2**							**3**	**3**	**3**
CO4	**3**	**3**	**3**	**3**	**2**							**3**	**3**	**3**

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	An Introduction to Machine Learning	Miroslav Kubat	2nd Edition, Springer, ISBN 978-3-319-63913-0 (eBook) ISBN 978-3-319-63912-3

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Machine Learning	Tom M. Mitchell	India Edition 2013, McGraw Hill Education, ISBN:13:9780070428072
2	Machine Learning – An Algorithmic Perspective	Stephen Marsland	2nd Edition, Chapman and Hall/CRC, 2014, ISBN-10:1466583282 ISBN-13:978-1466583283

Signature of the course Coordinator | **Signature of the HoD** | **Signature of the Dean (Academic Affairs)**

SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY- TUMAKURU

(A constituent College of Siddhartha Academy of Higher Education, Tumakuru)

Academic year 2024-2025

Department: Computer Science & Engineering		**Semester:**	**V**
Subject: Computer Network			
Subject Code:	**22CS503**	**L – T – P - C:**	**3 – 0 – 2 – 4**

Sl. No	Course Objectives
1	Understand the basics of data communication
2	Understand the error detection and correction techniques
3	Understand the routing algorithms and congestion control techniques
4	Analyze the services and features of transport layer protocols.

Unit	Description	Hrs
I	**Introduction:** Data communications: Components, Data Representation, Data Flow, Networks: Network Criteria, Physical structure, Network Types: Local Area Network, Wide Area Network, **Network models:** Protocol Layering: Scenarios, Principles of layering, Logical Connection, TCP/IP Protocol Suite: Layered architecture, Layers in the TCP/IP Protocol Suite, Description of each layer, Encapsulation and Decapsulation, The OSI Model**.**	8
II	**Error detection & correction:** Cyclic codes – CRC, Polynomials, Checksum. **Network Layer** Design Issues: Store-and-Forward Packet Switching, Services Provided to the Transport Layer, Implementation of Connectionless Service, Implementation of Connection-Oriented Service, Comparison of Virtual-Circuit and Datagram Networks.	8
III	**Network Layer Continued** Routing Algorithms: The Optimality Principle, Distance Vector Routing, Link State Routing, Congestion Control Algorithms: Approaches to Congestion Control, Traffic-aware routing, Admission control, Traffic throttling, Load Shedding Quality of Service: Application requirements, Traffic shaping, Packet scheduling, Admission control, Internetworking: Tunneling, Internetwork routing, Packet fragmentation. The Network Layer in the Internet: The IPV4 protocols, IP addresses, IPV6**.**	8
IV	**Network Layer Continued Transport Layer:** Services Provided to the Upper Layers, Transport Service Primitives, Berkeley Sockets, Elements of Transport protocols: Addressing, Connection establishment, Connection release, Error control and Flow control, Multiplexing, Crash recovery, **Introduction to UDP**: Remote Procedure Call. Introduction to TCP, The TCP Service Model, The TCP Protocol, The TCP Segment Header, TCP Connection Establishment, TCP Connection Release.	8
V	**Application Layer** TCP Connection Management Modeling, TCP Sliding window, TCP Timer Management, TCP Congestion Control. DNS-Domain Name System: The DNS Name Space, Domain Resource Records, Name Servers. Electronic	8

	Mail: Architecture and Services, The User Agent, Message Formats, Message Transfer, Final Delivery. HTTP-The Hyper Text Transfer Protocol.	

LAB CONTENT

Sl. No	PROGRAM DESCRIPTION
1	Simulate an Ethernet LAN using N nodes (6-10) change error rate and data rate and compare throughput.
2	Simulate a three-node point-to-point network with duplex links between them. Set the queue size and vary the bandwidth and find the number of packets dropped.
3	Simulate simple BSS with transmitting nodes in wire-less LAN and determine the performance with respect to transmission of packets.
4	Simulate the different types of Internet traffic such as FTP and TELNET over a network and analyze the throughput.
5	Simulate the transmission of ping messages over a network topology consisting of 6 nodes and find the number of packets dropped due to congestion
6	Write a program for Error Detecting code using CRC codes.
7	Write a program for distance vector routing algorithm to find the suitable path for transmission.
8	Write a program for congestion control using leaky bucket algorithm.
9	Write a program to implement Inter process Communication (IPC) using FIFO queues.
10	Using TCP/IP sockets, write a client - server program to make the client send the file name and to make the server send back the contents of the requested file if present.

Course Outcomes:

Course outcome	Descriptions
CO1	Describe the general principles of data communication
CO2	Identify the different types of signals and data codes for data communication
CO3	Analyze and apply various routing algorithms to find shortest paths for packet delivery
CO4	Explain the different protocols used at Transport Layer and application layer

Course Articulation Matrix

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1					2					2		
CO2	3	3	3	3			3					3		
CO3	3	3	2	3	3		3			1		2		
CO4	2	2	3	2	2	2	2			1		1		

Textbooks:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Data Communications and Networking,	Behrouz A. Forouzan:	5th Edition, Tata McGraw Hill, 2006 978-1-25-906475-3
2	Computer-Networks	Andrew S. Tanenbaum and David J. Wetherall	Pearson Education, 5th-Edition. (www.pearsonhighered.com/tanenbaum)

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Computer Networking A Top-Down Approach	James F. Kurose and Keith W. Ross	Pearson Education 7th Edition.
2	Data and Computer Communications	William Stallings	8th Edition, Pearson Education, ISBN- 978-81-317-1536-9

Signature of the course Coordinator **Signature of the HoD** **Signature of the Dean (Academic Affairs)**

SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY- TUMAKURU

(A constituent College of Siddhartha Academy of Higher Education, Tumakuru)

Academic year 2024-2025

Department: Computer Science & Engineering		**Semester:**	**V**
Subject: UNIX SYSTEM PROGRAMMING			
Subject Code:	**22CS5PE41**	**L – T – P - C:**	**3 – 0 – 0 – 3**

Sl. No	**Course Objectives**
1	Understand the fundamental design of the UNIX operating system
2	Learn to use UNIX Application Program Interface
3	Develop system level programs in the UNIX environment
4	Design and build applications over the UNIX operating system.

UNIT	**Description**	**Hours**
I	File Types, Inodes in UNIX System V, and Application Program Interface to Files, UNIX Kernel support for files, Relationship of C Stream pointers and file descriptors. General File APIs, File and Record Locking, Directory File APIs, Device File APIs, FIFO File APIs, Symbolic Link File APIs.	**8**
II	Introduction, main function, Process Termination, Command-Line Arguments, Environment List, Memory Layout of a C Program, Shared Libraries, Memory Allocation, Environment Variables, setjmp and longjmp Functions, getrlimit, setrlimit Functions. Introduction, Process Identifiers, fork, vfork, exit, wait, waitpid, wait3, wait4 Functions, Race Conditions, exec Functions, Interpreter Files, system Function	**8**
III	Introduction, Terminal Logins, Network Logins, Process Group, Sessions, Controlling Terminal, Tcgetpgrp, tcsetpgrp and tcgetsid functions, Job Control. Signal Concepts, Signal function, Kill and raise functions, Signal sets, Sigpromask, sigpending, sigaction, abort sleep functions.	**8**
IV	Introduction, Daemon Characteristics, Coding Rules, Error Logging, Client-Server Model. Introduction, Pipes, popen and pclose functions, FIFOs, Message Queues, Semaphores.	8
V	Socket APIs, Simple example using Socket APIs, History of RPC, RPC Programming Interface Levels, RPC Library Functions, rpcgen.	8

Course Outcomes:

Course outcome	**Descriptions**
CO1	Understand the fundamental concepts of UNIX API's.
CO2	Create and handle the process synchronization.
CO3	Demonstrate various signal API's.
CO4	Apply the concept Communication using IPC and Advanced IPC API's.

Course Articulation Matrix

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1										1		2
CO2	2	1	1									1		2
CO3	2	1		1								1		2
CO4	2	1	1	1								1		2

Text Books:

Sl No	Title	Author(s)	Edition, Publisher, Year, ISBN
1	Unix System Programming Using C++	Terrence Chan	Prentice Hall India, 2016 ISBN: 10: 0133315622
2	Advanced Programming in the UNIX Environment	W.Richard Stevens	3rd Edition, Pearson Education / PHI, 2017 ISBN: 978-0-321-63773-4

Reference Books:

Sl No	Title	Author(s)	Edition, Publisher, Year, ISBN
1	The Design of the UNIX Operating System	Maurice.J. Bach	Pearson Education / PHI, 1996 ISBN: 10 -0132017571
2	Advanced Unix Programming	Marc J. Rochkind	2nd Edition, Pearson Education, 2005 ISBN: 10: 0131411543

Signature of the course Coordinator **Signature of the HoD** **Signature of the Dean (Academic Affairs)**

SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY- TUMAKURU

(A constituent College of Siddhartha Academy of Higher Education, Tumakuru)

Academic year 2024-2025

Department: Computer Science and Engineering			**Semester:**	**V**
Subject: Advanced Data Structures and Algorithms				
Subject Code:	**22CS5PE42**		**L – T – P - C:**	**3 – 0 – 0 –3**

Sl. No	**Course Objectives**
1	To provide the foundations of the practical implementation and usage of Algorithms and Data Structures
2	To extend students' knowledge on data structures and algorithms.
3	To enhance students expertise in linear and nonlinear data structures.
4	To enhance students expertise in design and analysis of algorithm techniques.

Unit	**Description**	**Hrs**
I	Review of basic Data Structures: Importance and need of good data structures and algorithms, Strategies for choosing the appropriate data structures. Review of Analysis Techniques: Recurrences and Solution of Recurrence equations- The substitution method, the recurrence – tree method, the master method.	**8**
II	Advanced Data Structures: Red-Black Trees, Augmented Data Structures; B-trees, Fibonacci heaps, Data Structures for Disjoint Sets.	**8**
III	Graph Algorithms: Bellman-Ford Algorithm, Johnson's Algorithm for sparse graphs; Flow networks and Ford-Fulkerson method.	**8**
IV	Number -Theoretic Algorithms : Elementary notions; Modular Arithmetic; Solving modular linear equations; The Chinese remainder theorem. String-Matching Algorithms: Naïve string Matching; Rabin - Karp algorithm.	**8**
V	Lexical Search Tree and Graphs: Tries: Introduction to Tries, Trie structure, Trie search. Graphs: Terminologies, An application of graphs, C representation of graphs, Graph traversal techniques: Depth First traversal, Breadth First traversal.	**8**

Course Outcome:

Course outcome	**Descriptions**
CO1	Elucidate advanced algorithm and practical problem solving skills.
CO2	Comprehend advanced data structures and its requirement.
CO3	Analyse the efficiency of an algorithm.
CO4	Choose appropriate data structures and algorithm design approaches for solving a problem.

Course Articulation Matrix

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	3	2										
CO2	2	3	2	3							1			
CO3		2	2	2								1		
CO4	1	2	3	2		2								

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Introduction to Algorithms	T. H Cormen, C E Leiserson, R L Rivest and C Stein	3rd Edition, Prentice-Hall of India, 2010, ISBN-13:9780262033848
2	Data Structures: A Pseudocode Approach with C	Richard F. Gilberg and Behrouz A. Forouzan	2nd Edition, Cengage publication, 2007, ISBN-13: 9788131503140

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Algorithm Design	Kleinberg J., Tardos	1st Edition, Pearson, 2012, ISBN-13:9780321295354
2	Data Structure using C	Aaron M. Tenenbaum, YedidyahLangsam and Moshe J. Augenstein, Pearson	First edition, 2019, ISBN- 13: 9789332543546.

Signature of the course Coordinator | **Signature of the HoD** | **Signature of the Dean (Academic Affairs)**

SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY- TUMAKURU

(A constituent College of Siddhartha Academy of Higher Education, Tumakuru)

Academic year 2024-2025

Department: Computer Science and Engineering			**Semester:**	**V**
Subject:J2EE				
Subject Code:	**22CS5PE43**		**L – T – P - C:**	**3 –0 –0 –3**

Sl. No	Course Objectives
1	Appraise the concepts of Multi-threading and Event handling mechanisms.
2	Demonstrate JDBC process.
3	Familiarize server side programming through Servlets and JSP.
4	Demonstrate Remote Method Invocation to create distributed applications.

Unit	Description	Hrs
I	**Multi-Threaded Programming** The Java Thread Model, The Main Thread, Creating a Thread: Implementing Runnable, Extending threads, Creating Multiple Threads, Using isAlive() and join(), Thread Priorities, Synchronization, Interthread Communication.	8
II	**Event Handling** Event Handling: Two event handling mechanisms; The delegation event model; Event classes; Sources of events; Event listener interfaces; Using the delegation event model; Adapter classes; Inner classes.	8
III	**JDBC Objects** The Concept of JDBC; JDBC Driver Types; JDBC Packages; A Brief Overview of the JDBC process; Database Connection; Associating the JDBC/ODBC Bridge with the Database; Statement Objects; ResultSet.	8
IV	**Servlets** Background; The Life Cycle of a Servlet; Using Tomcat for Servlet Development; A simple Servlet; The Servlet API; The javax.servlet Package; Reading Servlet Parameter; The javax.servlet.http package; Handling HTTP Requests and Responses; Using Cookies; Session Tracking.	8
V	**JSP, RMI** Java Server Pages: JSP, JSP Tags; Request String; Java Remote Method Invocation: Remote Method Invocation concept; Server side; Client side.	8

Course Outcomes:

Course outcome	Descriptions
CO1	Explore Java libraries to develop threaded models.
CO2	Generate user friendly client-side applications.
CO3	Develop server-side applications.
CO4	Create web-based applications using Servlets and JSP.

Course Articulation Matrix

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2										2		
CO2	2	2										2		
CO3	2	2										2		
CO4	2	2										2		

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Java - The Complete Reference	Herbert Schildt	10th Edition, Tata McGraw Hill, 2018
2	J2EE - The Complete Reference	Jim Keogh	Tata McGraw Hill, 2017 Edition

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Introduction to JAVA Programming	Y. Daniel Liang	6th Edition, Pearson Education, 2007
2	The J2EE Tutorial	Stephanie Bodoff et al	2nd Edition, Pearson Education, 2004

Signature of the course Coordinator | **Signature of theHoD** | **Signature of the Dean (Academic Affairs)**

SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY- TUMAKURU

(A constituent College of Siddhartha Academy of Higher Education, Tumakuru)

Academic year 2024-2025

Department: Computer Science & Engineering			**Semester:**	**V**
Subject: Data Structures and Algorithms				
Subject Code:	**22CS5OE51**		**L – T – P - C:**	**3 – 0 – 0 – 3**

Sl. No	Course Objectives
1	Identify various efficient data storage mechanisms for easy access.
2	Design and implementation of various basic data structures.
3	Introduce various techniques for representation of the data in the real world.
4	Explore various applications of data structures.

Unit	Description	Hrs
I	**Introduction:** History of Algorithms, Definition, Structures and Properties of Algorithms, Development of an Algorithm, Data Structures and Algorithms, Data Structures - Definition and Classification. **Analysis of Algorithms**: Efficiency of Algorithms, Asymptotic Notations. **Arrays**: Introduction, Array Operations, Number of Elements in an Array, Representation of Arrays in Memory.	8
II	**Stacks** Introduction, Stack Operations: Stack Implementation, Implementation of push and pop operations, Applications: Recursive programming, Infix, Prefix and Postfix Expressions, Evaluation of postfix expressions.	8
III	**Queues** Introduction, Operations on Queues: Insert and Delete operations. **Queue Implementation:** Implementation of insert and delete operations on a queue, Limitations of linear queues. **Circular Queues:** Operations on a circular queue.	8
IV	**Linked Lists** Singly Linked List: Representation of a singly linked list, Insertion and deletion in a singly linked list. Doubly Linked List: Representation of a doubly linked list, Advantages and disadvantages of a doubly linked list, Operations on doubly linked lists.	8
V	**Trees** Trees: Definition and Basic Terminologies, Representation of Trees Binary Trees: Basic Terminologies and types, Representation of Binary Trees, Binary Tree Traversals.	8

Course Outcomes:

Course outcome	Descriptions
CO1	Describe the basics of algorithms and data structures.
CO2	Elucidate the working principle of linear data structures and non-linear Data structures.
CO3	Illustrate different operations on data structures.
CO4	Demonstrate applications of linear data structures and non-linear data structures.

Course Articulation Matrix

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1												
CO2	2	3	2	3										
CO3		2	3	2										
CO4		2	3	2		2					1			

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Data Structures and Algorithms: Concepts, Techniques and Applications	G.A. Vijayalakshmi Pai	Tata McGraw Hill Education (2015) ISBN 10: 0070667268 ISBN 13: 9780070667266

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Data Structures A Pseudocode approach with C	Richard F. Gilberg and Behrouz A. Forouzan	Second edition, enage publication, 2007, ISBN – 13:9788131503140

Signature of the course Coordinator **Signature of the HoD** **Signature of the Dean (Academic Affairs)**

SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY- TUMAKURU

(A constituent College of Siddhartha Academy of Higher Education, Tumakuru)

Academic year 2024-2025

Department: Computer Science and Engineering			**Semester:**	**V**
Subject: Data Base Management System				
Subject Code:	**22CS5OE52**		**L – T – P - C:**	**3 – 0– 0– 3**

Sl. No	Course Objectives
1	Knowledge of the architecture and functioning of Database Management Systems.
2	Understand and apply the principles of data modeling using Entity Relationship and develop a good database design.
3	Understand the use of Structured Query Language (SQL) and NoSQL
4	Apply normalization techniques to normalize a database and understand the need of database transaction.

Unit	Description	Hrs
I	**Introduction :** Introduction, An example, Characteristics of Database approach, Actors on the scene, Workers behind the scene, Advantages of using DBMS approach, A brief history of database applications, when not to use a DBMS. Data models, schemas and instances, Three schema architecture and data independence, Database languages and interfaces, The database system environment, Centralized and client-server architectures, Classification of Database Management systems.	**8**
II	**Data Modeling using the Entity-Relationship (ER) Model :** Using High-Level Conceptual, Data Models for Database Design, An Example Database Application, Entity Types, Entity Sets, Attributes and Keys, Relationship types, Relationship Sets, Roles and Structural Constraints, Weak Entity Types, Refining the ER Design, ER Diagrams, Naming Conventions and Design Issues, Relationship types of degree higher than two. Relational Database Design, Using ER- to-Relational Mapping. Relational Model : Relational Model Concepts, Relational Model Constraints and Relational Database Schemas, Update Operations, Transactions and dealing with constraint violations.	**8**
III	**SQL** : Data Definition and Data Types, Specifying constraints in SQL, Basic queries in SQL, Insert, Delete and Update statements in SQL, More complex SQL Queries,Views (Virtual Tables) in SQL, Schema change statements in SQL.	**8**
IV	**Database Design:** Informal Design Guidelines for Relation Schemas, Functional Dependencies, Normal Forms Based on Primary Keys, General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form.	**8**
V	**Transaction Management**: The ACID Properties, Transactions and Schedules, Concurrent Execution of Transactions, Lock- Based Concurrency Control, Dealing with Deadlocks, Transaction support in SQL. Introduction to ARIES and Write –Ahead Log protocol.	**8**

Course Outcomes:

Course outcome	Descriptions
CO1	Explain the concepts of database management system.
CO2	Design database using conceptual and relational model.
CO3	Apply normalization to create and manipulate a relational database using SQL.
CO4	Explain the basics of transactions processing and consistency control.

Course Articulation Matrix

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2											1		
CO2	3	3	3	2							2	3		
CO3	3	3	3	3	2		3	2				3		
CO4	1			2			3					2		

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Fundamentals of Database Systems	Elmasri and Navathe	7th Edition, Pearson Education, 2017, ISBN-13: 978-9332582705.
2	Big data And Analytics	Seema Acharya, Subhashini Chellappan, Infosys Limited	Publication Wiley India Private Limited, 1st Ed 2015. ISBN:978-81-265-5478-2

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Database Management Systems	Raghu Ramakrishnan and Johannes Gehrke	3rd Edition, McGraw-Hill, 2014, ISBN-13:978-9339213114.
2	An Introduction toDatabase Systems	C.J. Date, A. Kannan, S. Swamynatham	8th Edition, Pearson education,2017, ISBN-13:978-817585568.

Signature of the course Coordinator **Signature of the HoD** **Signature of the Dean (Academic Affairs)**

SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY- TUMAKURU

(A constituent College of Siddhartha Academy of Higher Education, Tumakuru)

Academic year 2024-2025

Department: Humanities and Sciences		**Semester:**	**V**
Subject: Research Methodology (Institutional Elective)			
Subject Code:	**22IE561**	**L – T – P - C:**	**2 – 0 – 0 – 2**

Sl. No	Course Objectives
1	To give an overview of the research methodology and explain the technique of defining a research problem.
2	To explain carrying out a literature search, its review and to explain various research designs and their characteristics.
3	To explain the details of sampling designs, and also different methods of data
4	To develop theoretical, conceptual frameworks, writing a review, to explain the art of interpretation and the art of writing research reports.

Unit	Description	Hrs
I	**Research Methodology:** Introduction, Meaning of Research, Objectives of Research, Motivation in Research, Types of Research, Research Approaches, Significance of Research, Research Methods versus Methodology, Research and Scientific Method, Importance of Knowing How Research is Done, Research Process, Criteria of Good Research, and Problems Encountered by Researchers in India. **Defining the Research Problem:** Research Problem, Selecting the Problem, Necessity of Defining the Problem, Technique Involved in Defining a Problem, An Illustration. **Bloom's Taxonomy Level:** L_1 – Remembering, L_2 – Understanding.	**6**
II	**Reviewing the literature:** Place of the literature review in research, Bringing clarity and focus to your research problem, Improving research methodology, Broadening knowledge base in research area, Enabling contextual findings, How to review the literature, searching the existing literature, reviewing the selected literature, Developing a theoretical framework, Developing a conceptual framework, Writing about the literature reviewed. **Bloom's Taxonomy Level:** L_1 – Remembering, L_2 – Understanding.	**5**
III	**Research Design:** Meaning of Research Design, Need for Research Design, Features of a Good Design, Important Concepts Relating to Research Design, Different Research Designs, Basic Principles of Experimental Designs, Important Experimental Designs. **Design of Sample Surveys:** Introduction, Sample Design, Sampling and Non-sampling Errors, Sample Survey versus Census Survey, Types of Sampling Designs. **Bloom's Taxonomy Level:** L_1 – Remembering, L_2 – Understanding.	**7**

IV	**Data Collection**: Experimental and Surveys, Collection of Primary and Secondary Data, Selection of Appropriate Method for Data Collection, Case Study Method. **Hypothesis**- Basic concepts, types of hypothesis, Formulation of hypothesis, testing of hypothesis, Analysis of data, **Interpretation of data-** Meaning of Interpretation, Technique of Interpretation, Precaution in Interpretation, Editing, classification and tabulation. **Bloom's Taxonomy Level:** L_1 – Remembering, L_2 – Understanding.	**6**
V	**Report Writing:** Significance of Report Writing, Different Steps in Writing Report, Layout. Types of Reports, Oral Presentation, Mechanics of Writing a Research Report, Precautions for Writing Research Reports. Research ethics, Citations, Similarity check. **Bloom's Taxonomy Level:** L_1 – Remembering, L_2 – Understanding, L_3 – Applying, L_4 – Analyzing.	**4**

Course Outcomes:

Course outcome	Descriptions
CO1	Discuss research methodology and the technique of defining a research problem
CO2	Explain the functions of the literature review in research, carrying out a literature search
CO3	Developing theoretical and conceptual frameworks and writing a review
CO4	Explain various research designs, their characteristics. explain the art of interpretation and the art of writing research reports

Course Articulation Matrix

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	3	2	1	2	2	1	1	3	3	2	3		
CO2	1	1	2	2	1	1	1	1	1	1	1	2		
CO3	3	3	3	3	1	2	2	1	3	3	2	3		
CO4	1	3	2	1	1	2	2	3	3	2	3	3		

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Research Methodology: Methods and Techniques	C.R. Kothari, Gaurav Garg	New Age International 4th Edition, 2018
2	Research Methodology a step-by-step guide for beginners. (For the topic Reviewing the literature under module 2	Ranjit Kumar	SAGE Publications Ltd. 3rd Edition, 2011

Reference Books:

Sl	Reference Book Title	Author	Volume and Year of Edition
1	Research Methods: the concise knowledge base	Trochim	Atomic Dog Publishing2005
2	Conducting Research Literature Reviews: From the Internet to Paper	Fink A	Sage Publications 2009

Question paper pattern: The question paper will have TEN questions. There will be TWO questions from each unit. Each question will have questions covering all the topics under a unit. The students will have to answer FIVE full questions, selecting ONE full question from each unit.

Signature of the course coordinator | **Signature of the HoD** | **Signature of the Dean (Academic Affairs)**

SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY- TUMAKURU

(A constituent College of Siddhartha Academy of Higher Education, Tumakuru)

Academic year 2024-2025

Department: Humanities and Sciences		**Semester:**	**V**
Subject: Management and Entrepreneurship(Institutional Elective)			
Subject Code:	**22IE562**	**L – T – P -**	**2 – 0 – 0 – 2**

Sl. No	**Course Objectives**
1	Explain fundamentals of management, functions of a manager. Also explain planning, organizing, and staffing, decision making processes and explain the organizational
2	Describe the understanding of motivation and different control systems in management, leadership process, understanding of Entrepreneurship and its development process
3	Illustrate Small Scale Industries, various types of supporting agencies and financing available for an entrepreneur and summarize the preparation of project report, need significance of report. Also to explain about industrial ownership
4	To explain various forms of the intellectual property, its relevance and business impact in the changing global business environment and to discuss leading International Instruments concerning Intellectual Property Rights

Unit	**Description**	**Hrs**
I	**Introduction** - Meaning, nature and characteristics of management, scope and Functional areas of management, goals of management, levels of management, **Planning-** Nature, importance, types of plans, steps in planning, **Organizing**- nature and purpose, types of Organization, Staffing- meaning, process of recruitment and selection. **Directing and controlling**- meaning and nature of directing, leadership styles, motivation Theories, Communication- Meaning and importance, Coordination meaning and importance, Controlling- meaning, steps in controlling, methods of establishing control. **Bloom's Taxonomy Level:** L_1 – Remembering, L_2 – Understanding.	**6**
II	**Entrepreneur** – meaning of entrepreneur, characteristics of entrepreneurs, classification and types of entrepreneurs, various stages in entrepreneurial process, role of entrepreneurs in economic development, entrepreneurship in India and barriers to entrepreneurship. Identification of business opportunities, market feasibility study, technical feasibility study, financial feasibility study and social feasibility study. **Bloom's Taxonomy Level:** L_1 – Remembering, L_2 – Understanding.	**5**
III	**Preparation of project and ERP (Enterprise resource planning)** - meaning of project, project identification, project selection, project report, need and significance of project report, contents, formulation, guidelines by planning commission for project report, Enterprise Resource Planning: Meaning and Importance- ERP and Functional areas of Management – Marketing / Sales- Supply Chain Management – Finance and Accounting – Human Resources – Types of reports and methods of report generation.	**5**

	Bloom's Taxonomy Level: L_1 – Remembering, L_2 – Understanding.	
IV	**Micro and Small Enterprises**: Definition of micro and small enterprises, characteristics and advantages of micro and small enterprises, steps in establishing micro and small enterprises, Government of India indusial policy 2007 on micro and small enterprises, case studies in respective domains. Institutional support: MSME-DI, NSIC, SIDBI, KIADB, KSSIDC, TECSOK, KSFC, DIC and District level single window agency. **Bloom's Taxonomy Level:** L_1 – Remembering, L_2 – Understanding.	**6**
	Intellectual Property: Introduction to IP**:** Importance of IPR, International conventions / agreements / treaties, Origin of IP law and history, laws related to IP in India: Indian Patent Act 1970, WIPO. **Patents:** Criteria for patentability, patentable and non-Patentable Matters, introduction to Prior Art Search, types of patent application: ordinary, convention, PCT, divisional and Patent of addition, filing procedure, drafting complete specification and claims. **Copyright:** Criteria, filing procedure, Copyright Infringement, rights of authorship and ownership, Fair Use, first sale doctrine, moral rights and economic rights. **Trademarks:** definition, eligibility Criteria, types of patents, filing procedure, Classification of Trademarks and well-known mark **Geographical Indications:** Definitions, importance, filing procedure, GI ecosystem in India and case laws **Industrial design:** eligibility criteria, Non-Protectable Industrial Designs India, Procedure for Registration, importance of design registration. **Bloom's Taxonomy Level:** L_1 – Remembering, L_2 – Understanding.	**6**

Course Outcomes:

Course outcome	Descriptions
CO1	Explain management functions of a manager. Also explain planning and decision making processes. Organizational structure, staffing and leadership
CO2	Describe the understanding of motivation and different control systems in management and understanding of Entrepreneurships and its development process.
CO3	Illustrate Small Scale Industries, various types of supporting agencies and financing available for an entrepreneur. Summarize the preparation of project report, need significance of report.
CO4	Shall get an adequate knowledge on patent and copyright for their innovative research works and provide further the way for developing their idea for innovations.

Course Articulation Matrix

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	2	2	1	3	2	3	3	3	2	2		
CO2	1	1	2	2	1	2	1	3	3	3	3	1		
CO3	1	2	3	2	1	3	2	3	3	3	3	1		
CO4	1	1	2	1	1	2	2	2	2	2	1	2		

Text Books:

Sl	Text Book title	Author	Volume and Year of
1	Principles of Management	P. C. Tripathi, P. N. Reddy	Tata McGraw Hill, 4th / 6th Edition, 2010.
2	Intellectual property rights - Unleashing the knowledge economy	Pmbuddha Ganguli	Tata Mccraw HiU Publishing Company Ltd

Reference Books:

Sl	Reference Book Title	Author	Volume and Year of Edition
1	Management and Entrepreneurship	Kanishka Bedi	Oxford University Press-2017
2	Entrepreneurship Development	S S Khanka	S Chand & Co.
3	Dynamics of Entrepreneurial Development & Management -	Vasant Desai	Himalaya Publishing House

Question paper pattern: The question paper will have TEN questions. There will be TWO questions from each unit. Each question will have questions covering all the topics under a unit. The students will have to answer FIVE full questions, selecting ONE full question from each unit.

Signature of the course coordinator | **Signature of the HoD** | **Signature of the Dean (Academic Affairs)**

Department: Humanities and Sciences		**Semester:**	**V**
Subject: Project Management (Institutional Elective)			
Subject Code:	**22IE563**	**L – T – P - C:**	**2 – 0 – 0 – 2**

Sl. No	**Course Objectives**
1	To understand the scope, timing and quality of the project, and to analyze the project goals, constraints, deliverables, performance criteria, control needs and resource requirement in consultation with stake holders
2	To implement the process of project management, life cycle and the embodied concepts, tools and techniques in order to achieve project success
3	To understand the team efforts and stakeholders in professional manner, respecting differences, to ensure a collaborative project environment
4	To apply project management practices to new programs, initiatives, products, services and events relative to the needs of stakeholders

COURSE TOPICS: The course has 28 lecture hours in 5 Units, 2- Lecture hours per week of 1-hour duration.

Unit	**Description**	**Hrs**
I	**Introduction:** Project, Program, and portfolio, Operations management, Product life cycle, Project life cycle, Project management life cycle, Role of project manager and office, Ten Project Knowledge areas with their associated processes **Project Integration Management**: Develop project charter, Develop project management plan, Direct & manage project work, Monitor control project, Perform integrated change control, Close project / phase.	**6**
II	**Project scope management:** Plan scope management, Collect requirements, Define scope, Create WBS (Work Breakdown Structure), Validate Scope, Control scope. **Project Schedule management**: **Plan Schedule management** Define activities, Sequence activities, Estimate activity durations, Develop schedule, and Control schedule. **Bloom's Taxonomy Level:** L_1 – Remembering, L_2 – Understanding. L3-Analyzing	**5**
III	**Project cost management:** Plan cost management, Estimate cost, Determine budget, and Control costs. Project quality management: Plan quality management, Manage quality and Control quality **Project resource management:** Plan resource management, Estimate activity resources, Acquire resources, Develop team, Manage team and Control resources. **Bloom's Taxonomy Level:** L_1 – Remembering, L_2 – Understanding. L3-	**6**

	Analyzing	
IV	**Project communication management:** Plan communication management , Manage communications and Monitor communications **Project risk management:** Plan risk management, Identify risks, Perform qualitative risk analysis, Perform quantitative risk analysis, Plan risk responses, Implement risk responses and Monitor risks. **Project Procurement management:** Plan procurement management, Conduct procurement, Control procurements. **Bloom's Taxonomy Level:** L_1 – Remembering, L_2 – Understanding. L3-Analyzing	**6**
V	**Project stake holder management:** Identify stake holders, Plan stake holder management, Manage stake holder engagement, and Monitor stake holder engagement. A case study relevant to the domain knowledge of the department is taken up to explain the principles of the project management as brought out above. **Bloom's Taxonomy Level:** L_1 – Remembering, L_2 – Understanding. L3-Analyzing	**5**

Course Outcomes:

Course outcome	Descriptions
CO1	Outline the procedure for analyzing a project and define the rational of work break structure
CO2	Illustrate the use of network techniques for successful project implementation
CO3	Design the procedure for overall financial analysis of the project alongside the resources requirement and ideal quality
CO4	Identify the sources and process for communication, risk management and procurement and build a comprehensive plan for the stakeholder management.

Course Articulation Matrix

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	1	2	2	1	2	2	3	3	3	2		
CO2	1	2	2	3	1	3	2	3	3	3	3	1		
CO3	1	3	2	1	1	2	1	3	3	3	3	1		
CO4	1	1	2	3	1	2	2	3	3	3	3	2		

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Project Management Book of Knowledge	Book of Knowledge	6th Edition, PMI, USA
2	Project Management	Dennis Lock	Taylor & Francis 10th Edition-2013

Reference Books:

Sl No	Reference Books Title	Author	Volume and Year of Edition
1	Project Planning: Analysis, Selection, Implementation and Review,	Prasanna Chandra	MC- Graw Hill Education, 8th Edition, 2017.
2	Project Management-a system approach to planning, scheduling	Harold Kerzner	CBS publications and Distributions,2002

Question paper pattern: The question paper will have TEN questions. There will be TWO questions from each unit. Each question will have questions covering all the topics under a unit. The students will have to answer FIVE full questions, selecting ONE full question from each unit.

Signature of the course coordinator	Signature of the HoD	Signature of the Dean (Academic Affairs)

SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY- TUMAKURU

(A constituent College of Siddhartha Academy of Higher Education, Tumakuru)

Academic year 2024-2025

Department: Computer Science and Engineering			**Semester:**	**V**
Subject: Dept. Skill Lab-3 Enterprise Lab				
Subject Code:	**22CS507**		**L – T – P - C:**	**1- 0- 2-2**

Sl. No	**Course Objectives**
1	To understand how a real world problem can be mapped to schemas.
2	To solve different industry level problems & to learn its applications.

LAB CONTENT

Sl. No	**Experiment Description**
1	**A. Consider the following schema for Insurance database:** PERSON (driver_id , name, address); CAR (regno, model, year); ACCIDENT (reportno, accd_date, location); OWNS (driver_id , regno); PARTICIPATED (driver_id, regno, reportno, damage_amt);
2	**B. Consider the following database schema for student database:** STUDENT (usn, name, major, bdate); COURSE (courseno, cname, dept); TEXT (book_ISBN, book_title, publisher, author); ENROLL (usn, courseno, sem, marks); BOOK _ ADOPTION (courseno, sem, book_ISBN);
3	**C. Consider the following schema for a Library Database:** BOOK (Book_id, Title, Publisher_Name, Pub_Year); BOOK_AUTHORS (Book_id, Author_Name); PUBLISHER (Name, Address, Phone); BOOK_COPIES (Book_id, Branch_id, No-of_Copies) ; CARD(Card_No) ; BOOK_LENDING (Book_id, Branch_id, Card_No, Date_Out, Due_Date) ; LIBRARY_BRANCH (Branch_id, Branch_Name, Address);
4	**D. Consider the following schema for Order Database:** SALESMAN (Salesman_id, Name, City, Commission) ; CUSTOMER (Customer_id, Cust_Name, City, Grade, Salesman_id); ORDERS (Ord_No, Purchase_Amt, Ord_Date, Customer_id, Salesman_id)
5	**E. Consider the schema for Movie Database:** ACTOR (Act_id, Act_Name, Act_Gender) ; DIRECTOR (Dir_id, Dir_Name, Dir_Phone) MOVIES (Mov_id, Mov_Title, Mov_Year, Mov_Lang, Dir_id) MOVIE_CAST (Act_id, Mov_id, Role) RATING (Mov_id, Rev_Stars)
6	**F. Consider the schema for Company Database:** DEPARTMENT (DNo, DName, MgrSSN, MgrStartDate) EMPLOYEE (SSN, Name, Address, Sex, Salary, SuperSSN, DNo) DLOCATION (DNo,DLoc) PROJECT (PNo, PName, PLocation, DNo) WORKS_ON (SSN, PNo, Hours)

	Instructions: Using given schema 1. Draw an Entity-Relationship(ER) Model. 2. Implement SQL Queries using DDL and DML Statements. 3. Implement SQL Nested queries and Views
7	Develop Django frame work

Course Outcomes:

Course outcome	Descriptions
CO1	Design database schema for a given problem-domain and enforce different constraints on a database using RDBMS.
CO2	Demonstrate the usage of SQL DML/DDL commands to populate and query a database.
CO3	Interpret, test and debug the program.
CO4	Build an authentication app in Django

Course Articulation Matrix

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	3	2											
CO2	1	2	1	2	3							1		
CO3	2	3	3	3	3			2	3	2	2	3		
CO4	2				2						2	2		

Signature of the course coordinator **Signature of the HoD** **Signature of the Dean (Academic Affairs)**

SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY- TUMAKURU
(A constituent College of Siddhartha Academy of Higher Education, Tumakuru)
Academic year 2024-2025

Department: Humanities and Sciences			**Semester:**	**V**
Subject: SKILL DEVELOPMENT-II (APTITUDE SKILLS)				
Subject Code:	**22SK508**		**L – T – P - C:**	**0-0-2-1**

Sl. No	Course Objectives
1	Develop Critical Thinking and Reasoning Skills
2	Master Seating and Arrangement Techniques
3	Enhance Analytical and Mathematical Reasoning
4	Apply Advanced Problem-Solving Strategies

COURSE TOPICS: The course has 28 lecture hours in 5 Units, 2- lecture hours per week of 1-hour duration.

Unit	Description	Hrs
I	**Logical Aptitude** - Syllogism, Venn-diagram method, Three statement syllogism, Deductive and inductive reasoning. Introduction to puzzle and games organizing information, parts of an argument, common flaws, arguments and assumptions. **Linear Seating Arrangement** Single or Double rows facing each other or away from each other in the same direction **Circular Seating Arrangement** · Uni- & Bi-directional problems on · Circular, Square, Rectangular, Hexagonal tables **Coding Decoding:** Letter Coding, Number Coding, symbol coding **Crypt arithmetic**: Basic concepts , addition , subtraction, multiplication of coded alphabets, Types of cryptarithm, Clocks and Calendar **Reasoning** – a. Verbal - Blood Relation, Sense of Direction, Arithmetic & Alphabet. Non- Verbal reasoning - Visual Sequence, Visual analogy and classification. Analytical Reasoning - Single & Multiple comparisons, Linear Sequencing.	6
II	**Permutation and Combination**: Understanding the difference between the permutation and combination, Rules of Counting-rule of addition, rule of multiplication, factorial function, Concept of step arrangement, Permutation of things when some of them are identical, Concept of 2n, Arrangement in a circle. **Probability**: Single event probability, multi event probability, independent events and dependent events, mutually exclusive events, non-mutually exclusive events, combination method for finding the outcomes.	6

III	**Number System** · Divisibility & Remainder, · Multiples & Factors,· Integers,· LCM & HCF,· Complete a number Series,· Find the Missing Term and Wrong Term **Simplification** · BODMAS Rule, · Approximation, · Decimals, · Fractions, · Surds & Indices **Percentage** Calculation-oriented basic percentage, Profit and Loss, Successive Selling type, Discount & MP, Dishonest Dealings, Partnerships Interest : Simple Interest, Compound Interest, Mixed Interest, Instalments. **Data Interpretation**: Approach to interpretation - simple arithmetic, rules for comparing fractions, Calculating (approximation) fractions, short cut ways to find the percentages, Classification of data– Tables, Bar graph, line graph, Cumulative bar graph, Pie graph, Combination of graphs. Combination of table and graphs	6
IV	**Averages and Allegations mixtures**: Average: relevance of average, meaning of average, properties of average, deviation method, concept of weighted average. Allegation method: a situation where allegation technique, general representation of allegations, the straight line approach, application of weighted average and allegation method in problems involving mixtures. Application of allegation on situations other than mixtures problems. **Data Sufficiency**: Questions based on > Quantitative aptitude, > Reasoning aptitude > Puzzles	4
V	**Ratio and Proportion** · Simple Ratios, · Compound Ratios, · Comprehend and Dividend · Direct & Indirect Proportions, · Problems on ages,· Mixtures & Allegation **Speed, Time and Distance** · Relative Speed, · Average Speed, · Problems on Train, · Boat & Stream. **Time and Work** · Work Efficiency, · Work & Wages, Pipes & Cisterns	6

Course Outcomes:

Course outcome	Descriptions
CO1	Enhanced Logical and Analytical Thinking
CO2	Proficiency in Advanced Arrangement and Sequencing Problems
CO3	Strong Numerical and Mathematical Aptitude
CO4	Effective Data Interpretation and Quantitative Analysis

Course Articulation Matrix

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1					2		3	3	3				
CO2	1					2		3	3	3				
CO3	1					2		3	3	3				
CO4	1					2		3	3	3				

Text Books:

Sl	Text Book title	Author	Volume and Year of
1	How to Prepare for Logical Reasoning for CAT" by Arun	Arun Sharma	• ISBN-10: 9352602280 • ISBN-13: 978-
2	A Modern Approach to Verbal & Non-Verbal Reasoning" by	R.S. Aggarwal	• ISBN-10: 8121924987 • ISBN-13: 978-

Reference Books:

Sl	Text Book title	Author	Volume and Year of
1	Quantitative Aptitude for Competitive Examinations" by R.S. Aggarwal	R.S. Aggarwal	ISBN-10: 9352534026 ISBN-13: 978-9352534021
2	Logical Reasoning and Data Interpretation for the CAT" by Nishit K. Sinha	Nishit K. Sinha	ISBN-10: 933922269X ISBN-13: 978-9339222694

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SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY- TUMAKURU

(A constituent College of Siddhartha Academy of Higher Education, Tumakuru)

Academic year 2024-2025

Department of Computer Science and Engineering

Scheme of Teaching and Examination (160 Credits Scheme, NEP Batch)
6th Semester B.E.
Effective from the Academic year 2024-25

SI No	Course Code		Course Title	Teaching Dept.	L	T	P	Credits	CIE Marks	SEE Marks	Total Marks	Exam Hrs
1	PC	22CS601	System Software and Compiler Design	CS	3	-	-	3	50	50	100	3
2	PC	22CS602	Web Technologies	CS	3	-	2	4	50	50	100	3
3	PC	22CS603	Cryptography and Network Security (CNS)	CS	3	-	2	4	50	50	100	3
4	PE	22CS6PE4X	Professional Elective-II	CS	3	-	-	3	50	50	100	3
5	OE	22CS6OE5X	Open Elective-II	HS	3	-	-	3	50	50	100	3
6	PC	22CS66X	NPTEL(22NP661)/MOOC(22MC662)/ SWAYAM(22SW663)	CS	2	-	-	2	50	-	50	-
7	PC	22CSMP607	Mini Project	CS	-	-	4	2	50	50	100	3
8	HS	22SK608	Pre placement Training	T&P	2	-	2	1	50	-	50	-
L: Lecture, T-Tutorial, P-Practical/Drawing, CIE: Continuous Internal Evaluation, SEE: Semester End Examination				Total	17	-	10	22	400	350	750	-

Credits Distribution: Basic Science (BS)=08+08+3+3=22, Engineering Science (ES)=10+11=21, Humanities & Social Sciences (HS)=1+2+2+1+3=09, Program Core (PC)=02+16+16+15+11=58, Program Elective (PE)=03+03=06, Open Elective(OE)=03+03=06, Project work (PW)=02, Total Credits=20+20+21+21+22+22=126 . Total 80 AICTE Activity points need to earn by each regular student and Total 55 AICTE Activity points need to earn by each Lateral entry student at the end of 3rd Year BE.

Professional Elective-II

22CS6PE41: Software Defined Networks
22CS6PE42: Fundamentals of Digital Image Processing
22CSPE643: Cloud Computing

Open Elective –II

22CS6OE51: Introduction to Data Science
2CS6OE52: Big Data

SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY- TUMAKURU

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Academic year 2024-2025

Department: Computer Science and Engineering			**Semester:**	**VI**
Subject: System Software and Compiler Design				
Subject Code:	**22CS601**		**L – T – P - C:**	**3- 0- 0-3**

Sl. No	Course Objectives
1	Learn different phases of compiler design in detail.
2	Gain knowledge about the parsing techniques using top-down and bottom-up approach.
3	Familiarize with source file, object file and executable file structures and libraries
4	Gain knowledge about intermediate code generation and target code generation.

Unit	Description	Hrs
I	**Introduction to System Software, Machine Architecture of SIC and SIC/XE**. Assemblers: Basic assembler functions, machine dependent assembler features, machine independent assembler features, assembler design options.	8
II	**Loaders and Linkers:** Basic Loader Functions, Machine Dependent Loader Features, Machine Independent Loader Features, Loader Design Options, Implementation Examples.	8
III	**Introduction, Lexical analysis:** Language processors; The structure of a Compiler; Lexical analysis: The Role of Lexical Analyzer; Input Buffering; Recognition of tokens. Syntax Analysis Introduction: The role of the parser, Syntax-Error Handling, Error- recovery strategies; Writing a Grammar: Lexical versus Syntactic analysis.	8
IV	**Syntax Analysis Contd…**Elimination of left-recursion and left-factoring; Top-down Parsing: Recursive-Descent Parsing, FIRST and FOLLOW; LL(1) Grammars, Non recursive Predictive Parsing.	8
V	**Syntax Analysis Contd…Bottom-up Parsing:** Reductions, shift-reduce parsing, Conflicts during shiftreduce parsing, Introduction to LR parsing: Simple LR: Why LR Parsers? Items and the LR (0) automaton, The LR parsing algorithm, Constructing SLR-parsing tables.	8

Course Outcomes (CO's):

Course outcome	Descriptions
CO 1	Apply the fundamental concepts for the various phases of compiler design & system software.
CO 2	Analyse the syntax and semantic concepts of a compiler.
CO 3	Design various types of parsers and Address code generation
CO 4	Implement compiler principles & methodologies

Course Articulation Matrix:

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	3		3							2		
CO2	2	3	3	2	3							2		
CO3	2	3	3	2	3							2		
CO4	2	3	3	2	3							2		

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Compilers-Principles, Techniques and Tools	Alfred V Aho, Monica S. Lam, Ravi Sethi, Jeffrey D Ullman	2nd Edition, Addison-Wesley, 2007. ISBN: 0-321-48681-1
2	System Software	Leland. L. Beck, D Manjula,	3rd edition, 2012 ISBN: 9788177585551

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Modern Compiler Implementation in C	Andrew W Apple	1st Edition, (Revised) Cambridge University Press, 2004 ISBN-13: 978-0521607650
2	Compiler Construction Principles & Practice	Kenneth C Louden	1st Edition, Thomson Education, 1997.ISBN-13: 97 -0534939724

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SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY- TUMAKURU

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Academic year 2024-2025

Department: Computer Science and Engineering			**Semester:**	**VI**
Subject: Web Technologies				
Subject Code:	**22CS602**		**L – T – P - C:**	**3- 0- 2-4**

Sl. No	**Course Objectives**
1	Familiarize the syntax and semantics of HTML and XHTML
2	To develop different parts of a web page
3	To understand how CSS can enhance the design of a webpage
4	To create and apply CSS styling to a webpage
5	To develop modern interactive web applications using JAVA

Unit	**Description**	**Hrs**
I	**Fundamentals of WWW:** A Brief Introduction to the Internet, The World Wide Web, Web Browsers, Web Servers, Uniform Resource Locators, client-server architecture, difference between static and dynamic web pages. Traditional HTML and XHTML: First Look at HTML and XHTML, Hello HTML and XHTML World, HTML and XHTML: Version History, HTML and XHTML DTDs: The Specifications Up Close, (X)HTML Document Structure, Browsers and (X)HTML, The Rules of (X)HTML, Major Themes of (X)HTML, The Future of Markup—Two Paths?	**8**
II	**HTML5**: Hello HTML5, Loose Syntax Returns, XHTML5, HTML5: Embracing the Reality of Web Markup, Presentational Markup Removed and Redefined, HTML5 Document Structure Changes, Adding Semantics, HTML5's Open Media Effort, Client-Side Graphics with , HTML5 Form Changes, Emerging Elements and Attributes to Support Web Applications	**8**
III	**Introduction to Cascaded Style Sheet:** What is CSS? CSS syntax, Location of styles, Selectors, The cascade: how styles interact, The Box model, CSS text styling. JavaScript: Client side scripting: What is JavaScript and what can it do, JavaScript design Principles. Where does JavaScript go, syntax, JavaScript objects, The Document Object model (DOM), JavaScript events, Forms, J Query foundations	**8**
IV	**Bootstrap 4:** Advantages, Implementing frame work files, Inserting the JavaScript files, starter template, Normalizing and Rebooting, Taking the starter template further, Using a static site generator, Converting the base template to a generator, Setting up the layout, Working with layouts: layouts, containers, creating a three column layout, Working with content: Reboot defaults and basics, how to style images, coding tables, Playing with components: Buttons, outlines, checkbox, radio etc.,	**8**

V	**Web Application Design :** Real-World Web Software Design ,Principle of Layering , Software Design Patterns in the Web Context, Data and Domain Patterns , Presentation Patterns , Testing	**8**

LAB CONTENT

Sl. No.	Experiment Description
1.	Create an HTML page to demonstrate using various HTML tags
2.	Create table using HTML tags. Properly align cells, give suitable cell padding and cell spacing, and apply background color, bold and emphasis necessary.
3.	Write a HTML program to develop a Registration Form.
4.	Write HTML for demonstration of cascading stylesheets.
5.	Write a JavaScript program to illustrate validation of web pages like login page.
6	Create a table with Bootstrap
7	Write the content to move one DIV element inside another using JQUERY.

Course Outcomes:

Course outcome	Descriptions
CO1	Understand HTML and XHTML
CO2	Develop HTML5 documents and add various semantic mark-up tags
CO3	Design and validate webpages using cascaded style sheets and frameworks
CO4	Apply the knowledge of HTML, CSS and JavaScript to develop webpages..

Course Articulation Matrix

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	3	1	3	2				1				2
CO2	1	3	2	1	2									3
CO3	1	1	2	2	3									1
CO4	1	1	2	2	3									3

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Fundamentals of Web Development	Randy Connolly, Ricardo Hoar	2nd edition, Pearson, 2017, ISBN 13: 978-0-13-340715-0
2	HTML & CSS: THE COMPLETE REFERENCE	Thomas Powell	McGraw Hill Education SBN-13 978-0070701946
3	Learning Bootstrap 4	Matt Lambert	2nd edition, PACKT Publishing(open source), 2016 ISBN 978-1-78588-100-8
4	Java - The Complete Reference 9th Edition,	Herbert Schildt	Tata McGraw Hill, 2014 ISBN: 978-1-25-900659-3

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Programming the World Wide Web	Robert. W. Sebesta	8th edition, Pearson,2015, ISBN-13: 978-0-13-377598-3
2	Introduction to Java Programming	Y Daniel Liang	10th edition, PHI ISBN-13: 978-0133761313 ISBN-10: 0133761312
3	The Java® Language Specification	James Gosling Bill Joy, Guy Steele Gilad Bracha Alex Buckley	Java SE 7 Edition ISBN-13: 978-0133260229

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SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY- TUMAKURU

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Academic year 2024-2025

Department: Computer Science and Engineering			**Semester:**	**VI**
Subject: Cryptography and Network Security				
Subject Code:	**22CS603**		**L – T – P - C:**	**3- 0- 2-4**

Sl. No	Course Objectives
1	Understand the fundamentals of cryptography
2	Acquire knowledge on standard algorithms used to provide confidentiality, integrity and authenticity
3	Describe how to deploy encryption techniques and various key distribution schemes to secure data in transit across data networks
4	Design security applications in the field of information technology

Unit	Description	Hrs
I	Introduction: The OSI Security Architecture, Security Services, Mechanisms and Attacks, A model of Network Security. Classical Encryption Techniques: Symmetric Cipher model, Substitution Techniques, Transposition Techniques, Steganography. Block Cipher and the Data Encryption Standard: Block Cipher principles, The Data Encryption Standard, DES Example, Strength of DES. Introduction, Symmetric ciphers	8
II	Symmetric ciphers (Contd...) Block Cipher Operation: Multiple Encryption and triple DES, Electronic Code Book, Cipher Block Chaining Mode, Cipher Feedback mode, Output Feedback mode, Counter mode. Number Theory: Prime Numbers, Format's and Euler's Theorems, Testing for Primality. Public-Key Cryptography and RSA: Principles of Public-Key Cryptosystems, The RSA Algorithm. Diffie-Hellman Key Exchange.	8
III	Cryptographic data integrity algorithms Cryptographic Hash Functions: Applications of Cryptographic hash functions, Two simple hash Functions, Secure Hash Algorithm. Message Authentication: Authentication Requirements, Authentication Functions, Message Authentication Codes, And Security of MACs, MACs based on Hash Functions: HMAC. Digital Signatures: Digital Signatures, Digital Signature Standard.	8
IV	Key management, Transport-level security Key Management and Distribution: Symmetric Key distribution using symmetric encryption, Symmetric Key distribution using Asymmetric encryption, Distribution of public keys, X.509 certificates, Kerberos. Transport level security: Web Security considerations, Secure Sockets Layer and Transport Layer Security.	8

V	Internet security, System security Electronic Mail Security: Pretty Good Privacy. IP Security: Overview, IP Security Policy. Intruders: Intruders, Intrusion detection. Malicious Software: Types of Malicious Software Viruses. Firewalls: The need for Firewalls, Firewall Characteristics, Types of Firewalls	8

Course Outcomes:

Course outcome	Descriptions
CO1	Explain the basic issues addressed by network security
CO2	Differentiate between working of typical symmetric and asymmetric ciphers.
CO3	Apply effective cryptographic techniques to provide security services in different applications and computer network.
CO4	Identify and describe vulnerabilities, attacks and IP security protocols in Internet domain

Course Articulation Matrix

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	1	1		2	2	3						
CO2	2	3	3		3		3	3			3	3		
CO3	3	3	3	3	3	3	3	3			3	3		
CO4		2		2	3	3	3	3				3		

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Cryptography and Network Security	William Stallings	6th Edition, Pearson Education, 2014, 978-93-325-1877-3

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Network Security: Private communication in a Public World	Charlie Kaufman, Radia Perlman, Mike Speciner	2nd Edition, Pearson Education Asia, 20020-13-046019-2
2	Cryptography and Network Security	Atul Kahate	Tatal VcGrawHill, 2003. 0-07-049483-5
3	NetworkSecurity: Private communication in a Public World	Charlie Kaufman, Radia Perlman, Mike Speciner	Second Edition, Pearson Education Asia, 2002 0-13-046019-2

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Academic year 2024-2025

Department: Computer Science and Engineering			**Semester:**	**VI**
Subject: : Software Defined Networks				
Subject Code:	**22CS6PE41**		**L – T – P - C:**	**3- 0- 0-3**

Sl. No	Course Objectives
1	Appraise the concepts of Software Defined Networks.
2	Demonstrate SDN flow control.
3	Familiarize with SDN programming.
4	Get acquainted with SDN frameworks.

Unit	Description	Hrs
I	**INTRODUCTION:** History of Software Defined Networking (SDN) – Modern Data Center – Traditional Switch Architecture – Why SDN – Evolution of SDN – How SDN Works – Centralized and Distributed Control and Date Planes	8
II	**OPEN FLOW & SDN CONTROLLERS:** Open Flow Specification – Drawbacks of Open SDN, SDN via APIs, SDN via Hypervisor- Based Overlays – SDN via Opening up the Device – SDN Controllers – General Concept	8
III	**DATA CENTERS:** Multitenant and Virtualized Multitenant Data Center – SDN Solutions for the Data Center Network – VLANs – EVPN – VxLAN – NVGRE	8
IV	**SDN PROGRAMMING:** Programming SDNs: Northbound Application Programming Interface, Current Languages and Tools, Composition of SDNs – Network Functions Virtualization (NFV) and Software Defined Networks: Concepts, Implementation and Applications	8
V	**SDN:** Juniper SDN Framework – IETF SDN Framework – Open Daylight Controller – Floodlight Controller – Bandwidth Calendaring – Data Center Orchestration.	8

Course Outcomes:

Course outcome	Descriptions
CO1	Appreciate the concepts of Software Defined Networks.
CO2	Associate various SDN Principles with different Architectures
CO3	Apply concepts of Virtualization, Framework solutions on Data Centers.
CO4	Analyze Software Defined Network scenarios.

Course Articulation Matrix

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2							2				1		
CO2	2							2				1		
CO3	2	2						2				1		
CO4	2	2						2				1		

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Software Defined Networks: A Comprehensive Approach	Paul Goransson and Chuck Black	First Edition, Morgan Kaufmann, 2014.
2	SDN: Software Defined Networks	Thomas D. Nadeau, Ken Gray	O'Reilly Media, 2013.

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Software Defined Networking with Open Flow	Siamak Azodolmolky	Packet Publishing, 2013
2	SDN and Open Flow for Beginners	Vivek Tiwari	Amazon Digital Services, Inc., 2013.
3	Network Innovation through Open Flow and SDN: Principles and Design.	Fei Hu, Editor	CRC Press, 2014.

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Academic year 2024-2025

Department: Computer Science and Engineering			**Semester:**	**VI**
Subject: Fundamentals of Digital Image Processing				
Subject Code:	**22CS6PE42**		**L – T – P - C:**	**3 – 0 – 0 –3**

Sl. No	Course Objectives
1	Acquire fundamental concepts of digital image processing
2	Learn image preprocessing techniques
3	Gain the knowledge of extracting the features from digital image
4	Exposure to simulate simple image processing algorithms

Unit	Description	Hrs
I	**Introduction:** What is Digital Image Processing?, Fundamental Steps in Digital Image Processing, Components of an Image Processing System, Digital image representation, examples of field that use DIP. Simple image model, Sampling and quantization, some basic relationships between pixels, some basic transformations	**8**
II	**Digital image properties:** Histogram, Entropy, Eigen Values and Image quality metrics **Operations on digital images**: Addition, subtraction, multiplication and division. Logical operations: AND, OR and NOT. Spatial operations: Single pixel, neighborhood, contrast stretching, intensity slicing, Bit-plane slicing and power law transformations	**8**
III	**Image enhancement in the spatial domain:** Background, Basic gray level transformations, histogram processing, enhancement using arithmetic/logic operations, basics of spatial filtering, smoothing and sharpening spatial filters, combining spatial enhancement methods.	**8**
IV	**Image enhancement in the frequency domain:** Introduction to the frequency domain, smoothing and sharpening frequency domain filters, Homomorphic filtering, implementation, generation of spatial masks from frequency domain specifications, basics of color image processing	**8**
V	**Image segmentation:** Edge Detection - Line Detection - Curve Detection, Boundary Representation, Region Representation And Segmentation, Morphology-Dilation, Erosion, Opening And Closing	**8**

Course Outcomes:

Course outcome	Descriptions
CO1	Describe the fundamental concepts of a digital image processing and pattern classification.
CO2	Analyze image preprocessing techniques.
CO3	Employ basic segmentation procedures to extract region of interest.
CO4	Apply suitable morphological operations for region description

Course Articulation Matrix

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2											2		
CO2		2										2		
CO3			2	3								1		
CO4				3										

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Digital Image Processing using Mat Lab	R. C. Gonzalez, R. E. Woods	Publisher: Pearson-Prentice-Hall, ISBN: 0-13-008519-7,2nd Edition: 2018
2	Image Processing and Analysis	Jayaraman and Esaki Rajan	Mc Hill India, 2009

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Digital Image Processing	R. C. Gonzalez and R. E Woods	Publisher: Pearson Education, I*SBN*-10: 013168728X, 3rd Edition: 2007.
2	Pattern Classification	R. O. Duda, P. E. Hart, D. G. Stork,	Publisher: Wiley ISBN-13: 978-1-118-45668-2, ISBN: 1-118-45668-8, 3rd Edition, 2016

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Academic year 2024-2025

Department: Computer Science & Engineering			**Semester:**	**VI**
Subject: Cloud Computing				
Subject Code:	**22CS6PE43**		**L – T – P - C:**	**3 – 0 – 0 –3**

Sl. No	Course Objectives
1	Study cloud computing paradigm.
2	Classify various cloud services and their providers.
3	Study various cloud deployment models.
4	Analyze various types of computing environments and Identify enabling technologies of cloud computing.

Unit	Description	Hrs
I	Introduction to Cloud Computing: Glance of computing, The vision of Cloud Computing, Defining a cloud, A closer look, Cloud computing reference model, Characteristics and benefits , Challenges ahead, Historical developments: Distributed systems, Virtualization, Web 2.0; Service oriented computing; Utility oriented computing	8
II	Architectures for parallel and distributed computing: Parallel Vs Distributed computing, Elements of distributed computing, Technologies for distributed computing: Remote procedure call, Distributed object frameworks.	8
III	Virtualization: Introduction, Characteristics of virtualized environments, Taxonomy of virtualization techniques, Virtualization and cloud computing, Pros and cons of virtualization, Technology examples: Xen: Para virtualization, VmWare.	8
IV	Cloud computing architecture: Introduction, Cloud reference model: Architecture, IaaS, PaaS, SaaS, Types of Clouds: Public, Private, Hybrid and Community clouds, Economics of the cloud, Open challenges.	8
V	Cloud Tools and Applications: Aneka-Framework overview, Anatomy of the Aneka container, Building Aneka clouds, Cloud programming and management.	8

Course Outcomes:

Course outcome	Descriptions
CO1	Comprehend the concepts of Cloud computing paradigms and various levels of services that can be achieved by cloud.
CO2	Appreciate the concepts of virtualization to increase availability of high-performance applications.
CO3	Analyze various cloud computing architectures and apply them to solve problems on the cloud.
CO4	Understand the Cloud platforms in industry to reduce implementation and maintenance costs.

Course Articulation Matrix

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	3	3	1			1				1		
CO2	1	3	2	3							1			
CO3	1	3	3	3	3			1				1		
CO4	1	2	2		2					1	2	2		

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Mastering Cloud Computing	Rajkumar Buyya, Christian Vecchiola, ThamaraiSelci	Tata McGraw Hill, New Delhi, India, 2013 **ISBN: 978-0-12-411454-8**

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Cloud Computing for Dummies	Judith Hurwitz, R.Bloor, M. Kanfman, F.Halper	Wiley India Edition **ISBN: 978-0-470-48470-8**
2	Cloud Computing: A Practical Approach	J.Vette, Toby J. Vette, Robert Elsenpeter	Tata McGraw Hill **ISBN -978-0-07-16295-8**

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Academic year 2024-2025

Department: Computer Science and Engineering			**Semester:**	**VI**
Subject: Introduction to Data Science				
Subject Code:	**22CS6OE51**		**L – T – P - C:**	**3-0- 0-3**

Sl. No	Course Objectives
1	To demonstrate proficiency with statistical **analysis of data**.
2	To develop the ability to build and assess data-based **models**.
3	To demonstrate skill in **data management.**
4	To apply data science concepts and methods to **solve** problems in real-world contexts and will **communicate** these solutions effectively.

Unit	Description	Hrs
I	**Introduction**: What Is Data Science?, Where Do We See Data Science?, How Does Data Science Relate to Other Fields?, The Relationship between Data Science and Information Science, Skills for Data Science, Tools for Data Science, Issues of Ethics, Bias, and Privacy in Data Science. **Data**: Introduction, Data Types, Structured Data, Unstructured Data, Challenges with Unstructured Data, Data Collections, Open Data, Social Media Data, Multi modal Data, Data Storage and Presentation, Data Pre-processing.	**8**
II	**Data Analysis and Data Analytics Techniques**: Introduction, Descriptive Analysis, Diagnostic Analytics, Predictive Analytics, Prescriptive Analytics, Exploratory Analysis, Mechanistic Analysis. **Python:** Introduction**,** Getting Access to Python, Basic Examples, Control Structures.	**8**
III	**MySQL :** Introduction**,** Getting Started with MySQL, Creating and Inserting Records, Retrieving Records, Searching in MySQL, Accessing MySQL with Python, Introduction to Other Popular Databases.	**8**
IV	**Machine Learning Introduction and Regression:** Introduction, What Is Machine Learning?, Regression, Gradient Descent, **Supervised Learning:** Introduction**,** Logistic Regression, Softmax Regression, Classification with KNN, Decision Tree, Decision Rule, Classification Rule, Association Rule, Random Forest, Naïve Bayes, Support Vector Machine (SVM)	**8**
V	**Unsupervised Learning Introduction**: Agglomerative Clustering, Divisive Clustering, Expectation Maximization (EM), Introduction to Reinforcement Learning. **Hands-On with Solving Data Problems:** Introduction, Collecting and Analyzing Twitter Data, Collecting and Analyzing YouTube Data, Analyzing Yelp Reviews and Ratings.	**8**

Course Outcomes:

Course outcome	Descriptions
CO1	Describe the significance of data science and understand the Data Science process.
CO2	Understanding the process of how data is collected, managed and stored for data science.
CO3	Build and prepare data for use with a variety of statistical methods and models.
CO4	Apply data science concepts and methods to solve problems in the real-world.

Course Articulation Matrix:

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		2	2	3								1		
CO2		2	2									1		
CO3		2	2	2								1		
CO4		2	3	3	2									

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	A Hands-On Introduction to Data Science	Chirag Shah	First published: 2020, ISBN 978-1-108-47244-9

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Hands On Data Science and Python Machine Learning	Frank Pane	Packt Publishers, 2017. ISBN-13 978-1787280748
2	Bigdata And Analytics	SeemaAcharya,Subhashini Chellappan, Infosys Limited	Publication: Wiley India Private Limited,1st Edition 2015. ISBN:978-81-265-5478-2

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Academic year 2024-2025

Department: Computer Science and Engineering			**Semester:**	**VI**
Subject: Big Data				
Subject Code:	**22CS6OE52**		**L – T – P - C:**	**3 – 0 – 0 –3**

Sl. No	Course Objectives
1	Role of bigdata analytics in optimizing business decisions and creating competitive advantages.
2	Explore the fundamental concepts of big data analytics.
3	Understand the applications using Map Reduce Concepts.
4	Introduce programming tools PIG and HIVE in Hadoop echo system.

Unit	Description	Hrs
I	**Types of Digital data** Classification of Digital Data, Introduction To Big Data, Characteristics of Data, Evolution of Big Data, Definition on Big Data, Challenges with Big Data, What is Big Data?, Other Characteristics of Data which are not Definitional Traits of big Data, Why Big Data?, Are we just an Information Consumer or Do we Produce Information?, Traditional Business Intelligence (B1) versus Big Data, A Typical Data Warehouse Environment, A Typical Hadoop Environment, What is new Today?, What is Changing in the Realms of Big Data?	**8**
II	**Big data Analytics** Where do we Begins?, What is Big Data Analytics, What Big Data Analytics Isn't?, Why this Sudden Hype Around Big Data Analytics, Classification of Analytics, Greater Challenges that Prevent Business from Capitalizing on Big Data, Top Challenges facing Big Data, Why is Big Data Analytics Important?, What kind of Technologies are we looking toward to Help Meet the Challenges Posed by Big Data?, Data Science, Data Scientist…Your New Best Friend!!!, Terminologies used in Big Data Environments, Basically available Soft state Eventual Consistency(BASE), Few Top Analytics Tools.	**8**
III	**The Big data Technology Landscape** NoSQL (Not Only SQL), Hadoop, Introduction Hadoop, Why Hadoop? , Why not RDBMS? ,RDBMS versus Hadoop, Distributed Computing Challenges, History of Hadoop, Hadoop Overview, Use Case of Hadoop, Hadoop Distributors, HDFS(Hadoop Distributed File System) ,Processing Data with Hadoop, Managing Resources and Applications with Hadoop YARN(Yet Another Resource Negotiator), Interacting with Hadoop Ecosystem.	**8**

IV	**Introduction To Mapreduce and Hive Programming** Introduction, Mapper, Reducer, Combiner, Partitioner, Searching, Sorting, Compression, Introduction to Hive, Hive Architecture, Hive Data Types, Hive File Format, Hive Query Language(HQL) ,RCFile Implementation, SerDe ,User-Defined Function(UDF)	**8**
V	**Introduction To Pig** What is Pig?, The Anatomy of Pig , Pig of Hadoop, Pig Philosophy, Use Case For Pig: ETL Processing, Pig Latin Overview, Data Types in Pig, Running Pig, Execution Modes of Pig, HDFC Commands, Relational Operators, Eval Function, Complex Data Types, Piggy bank, User-Defined Function(UDF), Parameter Substitution, Diagnostic Operator, Word Count Example using Pig, When to use Pig?, When to use Pig?, Pig at Yahoo!, Pig versus Hive.	**8**

Course Outcomes:

Course outcome	Descriptions
CO1	Identify the characteristics of datasets and compare the trivial data and Big data for various applications.
CO2	Explore hadoop software framework and supported tool to empower any meaningful conversation on Big data and analytics.
CO3	Compare and Contrast different Hadoop supporting tools with traditional tool.
CO4	How Big Data can be analyzed to extract knowledge and apply tools for Bigdata analytics.

Course Articulation Matrix

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2		1			1						1		
CO2	1		2	2								1		
CO3	1				3							1		
CO4				1	3			1				1		

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Big Data and Analytics	Seema Acharya, Subhashini Chellappan, Infosys Limited	Publication: Wiley India Private Limited,2nd Edition 2019. ISBN:978- 81-265-7951-8

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Hadoop in Practice	Alex Holmes	Manning Publications Co., January 2015, Second Edition. ISBN-13:978 9351197423
2	2 Programming Pig	Alan Gates, O'Reilly	Kindle Publication. 2017, ISBN-978-1-491-93709-9
3	Programming Hive	Dean Wampler	1st Edition, O'Reilly Media, 2012, ISBN:978-1-449-31933-5

Signature of the course coordinator **Signature of the HoD** **Signature of the Dean (Academic Affairs)**

SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY- TUMAKURU

(A constituent College of Siddhartha Academy of Higher Education, Tumakuru)

Academic year 2024-2025

Department: Computer Science and Engineering			**Semester:**	**VI**
Subject: Mini Project				
Subject Code:	**22CSMP607**		**L – T – P - C:**	**0 – 0 – 4 –2**

Experiment Description
Mini Project Work Guidelines: As a part of Mini project, all the students must carry out the following activities: 1. Students should form a group to carry out their project. The minimum of 1 student and a maximum of 2 in a group. 2. The groups will be attached to one Internal Guide by the Department. 3. Students have to carry out a detailed survey on the Topic on which they are interested to carry out the Mini-Project work. Students are expected to submit the Synopsis. 4. Based on survey identify the Problem statement in concerned with guide and prepare the squire specification report. 5. Implement the project work within the timeline. 6. Prepare and Give the presentation on time. 7. Prepare Project document and demonstrating their work. **Note:** • **Department encourages to do the interdisciplinary projects. (Guides will look in to that.)** • **Students can do the mini project in such a way that he / she may continue the same project work for final year.**
Procedure for Guide allotment Collecting the area of interest both from Students and as well as the staff and then we match the area of each other and allocate the guides’
Mini Project Work Evaluation Scheme **Evaluation Scheme:** Continuous evaluation will be done by respective Project Guides based on the following points: Regularity, Technical Knowledge and Competence, Programming Skills, Communication Skills, Demonstration skills, Technical Competence, presentation, Team Work and Documentation Skills of the students.

Course Outcomes:

Course outcome	Descriptions
CO1	Apply the engineering knowledge to identify the problem in a specified area.
CO2	Analyze the problem and design the high level modules.
CO3	Design the suitable ecological algorithms / methodologies and plan to work with a team.
CO4	Implement the solutions by selecting suitable language / tools / platforms / frameworks.
CO5	Communicate effectively through oral presentation and prepare detailed report describing the project and results.

Course Articulation Matrix

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3											2		
CO2		2										2		
CO3		2	3						3			2		
CO4					3							2		
CO5										3	1			

Signature of the course coordinator | **Signature of the HoD** | **Signature of the Dean (Academic Affairs)**

SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY- TUMAKURU

(A constituent College of Siddhartha Academy of Higher Education, Tumakuru)

Academic year 2024-2025

Department: Humanities and Sciences			**Semester:**	**VI**
Subject: Preplacement Training(Aptitude Skills) (For IT branches- CSE,ISE,EEE,ECE,ETE & MLE)				
Sub code:	**22SK608 (IT)**		**L – T – P - C:**	**0-0-2-1**

Sl. No	**Course Objectives**
1	Fundamental Understanding of C Programming
2	Proficiency in Advanced C Programming Concepts
3	Mastery of File Management and Preprocessor Directives in C
4	Introduction to Object-Oriented Programming with C++

Unit	**Description**	**Hrs**
I	**Reasoning Aptitude :** **Logical Aptitude** - Syllogism, Venn-diagram method, Three statement syllogism, Deductive and inductive reasoning. Introduction to puzzle and games organizing information, parts of an argument, common flaws, arguments and assumptions. **Linear Seating Arrangement:** Single or Double rows facing each other or away from each other in the same direction **Circular Seating Arrangement**: · Uni- & Bi-directional problems on · Circular, Square, Rectangular, Hexagonal tables **Coding Decoding:** Letter Coding, Number Coding, symbol coding Crypt arithmetic: Basic concepts , addition , subtraction, multiplication of coded alphabets, Types of cryptarithm Clocks and Calender **Reasoning** – a. Verbal - Blood Relation, Sense of Direction, Arithmetic & Alphabet.Non- Verbal reasoning - Visual Sequence, Visual analogy and classification.Analytical Reasoning - Single & Multiple comparisons, Linear Sequencing. **Verbal Aptitude: Brush Up on -** > Reading Comprehension: > Para Jumbles > Sentence Completion > Antonyms/Synonyms > Error in Sentences > Sentence Rearrangement > Idioms and Phrases > Verbal Analogies > Articles **Quantitative Aptitude - I** Permutation and Combination: Understanding the difference between the permutation and combination, Rules of Counting-rule of addition, rule of multiplication, factorial function, Concept of step arrangement, Permutation of things when some of them are identical, Concept of 2n, Arrangement in a circle. Probability: Single event probability, multi event probability, independent events and dependent events, mutually exclusive events, non-mutually exclusive events, combination method for finding the outcomes.	**24**

	QuantitativeAptitude – II Brush Up on : Number System, Percentage, Interest : Simple Interest, Compound Interest, Mixed Interest, Installments. Data Interpretation: Approach to interpretation - simple arithmetic, rules for comparing fractions, Calculating (approximation) fractions, short cut ways to find the percentages, Classification of data– Tables, Bar graph, line graph, Cumulative bar graph, Pie graph, Combination of graphs. Combination of table and graphs **QuantitativeAptitude - III** Data Sufficiency: Questions based on > Quantitative aptitude > Reasoning aptitude > Puzzles **QuantitativeAptitude – IV** Ratio and Proportion- · Simple Ratios · Compound Ratios · Comprehend and Dividend · Direct & Indirect Proportions, · Problems on ages · Mixtures & Allegation Speed, Time and Distance · Relative Speed · Average Speed,· Problems on Train · Boat & Stream. Time and Work · Work Efficiency · Work & Wages Pipes & Cisterns	
II	**Grooming: Work Ethic and Professionalism** > Defining Work Ethic: Traits and Characteristics, > The Importance of Reliability and Accountability > Maintaining Confidentiality, > Building a Positive Professional Image > Balancing Professionalism with Personal Authenticity **Interview Skills:** > Introduction to Interviews > The Purpose of an Interview > Different Types of Interviews: Telephonic, Face-to-face, Panel, Behavioral, and Technical > **Before the Interview:** > Researching the Company/Organization, > Analyzing the Job Description > Preparing Relevant Answers for Common Interview Questions > **During the Interview:** > Dress Code and Personal Grooming, > Body Language: Eye Contact, Posture, and Handshake, > Listening Actively and Responding Clearly, > Asking Thoughtful Questions to the Interviewer > **Technical vs Behavioral Interviews:** > Understanding Technical Skill Evaluation, > STAR Technique (Situation, Task, Action, Result) for Behavioral Questions > **Handling Challenging Questions and Situations:**> Addressing Gaps in Employment, > Discussing Strengths, Weaknesses, and Failures, > Navigating Salary Discussions **> After the Interview:** > Crafting a Follow-up Email or Letter, > Reflecting on Interview Performance, > Preparing for the Next Steps	**36**

III	**Email and Virtual Communication:** > Email Etiquette: Do's and Don'ts, > Crafting Effective Emails: Clarity, Brevity, and Tone, > Best Practices for Virtual Meetings (Zoom, Teams, etc.), > Virtual Communication Tools, > Navigating Time Zones, Cultural Differences, and Other Challenges **Business Etiquettes:** > Greetings and Introductions in Business Settings,> Business Dining Etiquette, > Dress Code and Personal Grooming, > Electronic Etiquette: Phone, Email, and Social Media, > International Business Etiquette: Understanding Cultural Differences **Technical skills:** Competitive Coding with C Programming: Covered Topics **C Programming (A):** - Data Types, Operators, and Expressions, - Input and Output Operations, - Control Flow – Branching and Looping - Statements and Blocks,- If..Else, Switch, Nesting of If..Else, - GOTO Statement, - The While Statement - The For Statement, - The Do Statement,- Jumps in Loops **C Programming (B):** - Arrays and Strings, - One-dimensional Arrays, - Initialization of One-dimensional Arrays,- Two-dimensional Arrays - Initializing Two-dimensional Arrays, - Multi-dimensional Arrays, - Dynamic Arrays, - Declaring and Initializing String Variables, - Reading Strings from the Terminal, - Writing Strings to the Screen, - String Handling Functions - Operations on Strings **C Programming (C):** - User-defined Functions and Structures, - Basics of Functions, - Functions Returning Non-integers, - External Variables, Scope Rules, - Header Files, Static Variables, Register Variables, - Block Structure, Initialization, Recursion, - Categories of Functions, Functions Returning Multiple Values, - Nesting Functions, Multi-file Programs - Structures and Functions, Arrays of Structures, - Pointers to Structures, Self-referential Structures	
IV	**C++ :Object oriented Programming** · Class and Objects ,· Dynamic Memory Management POP, · OOPs in C++ ,· Console Input / Output in C++ ,· Comment lines in C++ ,· Importance of function prototyping in C++ ,· Function overloading · Inline functions and default arguments ,· Scope Resolution Operator ,· Structures ,· Defining function outside the class ,· Friend functions, Friend class ,· Array of class objects ,· Passing class objects to and returning class objects from functions ,· Nested classes, Namespaces ,· Dynamic memory allocation using new and deallocation, new handler function.	
V	**Data Structures:** · Introduction to Data-structures, Arrays and Strings,· Recursion Data Structures,· Types, Arrays, Structures, Self-Referential Structures, and Unions. ,· Pointers and Dynamic Memory Allocation ,· Operations related data-structures · Functions. Representation of Linear Arrays in Memory,· Dynamically allocated arrays,· Sorting and searching in arrays,· Operations on arrays: inserting, deleting traversing, Stacks, Queues, Linked lists, • Stack operations, implementing queue	

	using stack, • Applications of stack: converting Infix to postfix expressions,• Evaluating expressions, Using stacks to represent arrays,• Types of queues: Ordinary queue, Circular queue, Priority queue, Dequeue,• Implementing queue using multiple stacks,• Drawback in stacks and arrays,• Advantages of linked list over stacks and queues with memory examples,• Types of linked list, • Writing examples on singly linked list,• Doubly linked lists and circular linked lists,• Various operations like insertion deletion and searching for a element in linked list and reversing linked list,• Implementing arrays queues and stacks using linked list **Trees, Graphs and Traversal Methods, Sorting and Searching, Hashing** • Creating trees using linked list data-structures,• Binary tree programming examples, • Types of binary trees,• Solving problems on Inorder Preorder and Postorder traversal of Binary trees, • Binary tree operations,• Writing threaded binary trees, • Insertion deletion and traversal of Binary search trees, • Applications of trees, valuation of expressions using trees, • Programming examples, • Different types of representing graphs: Adjacency list and matrix representation,• Various graph operations and terminologies **Hashtag**: • Hashtag Programming,• Hash-table organization,• Hashing functions,• Static and Dynamic hashing	
	Algorithms: Sorting Algorithm-1. Bubble sort,2. Selection sort,3. Insertion sort,4. Merge sort,5. Quick sort,6. Shell sort,7. Heap sort **Searching Algorithm:** 1. Linear search, 2. Binary search,. Greedy Algorithm,. Divide & conquer Algorithm, . Dynamic Programming	

Course Outcomes:

Course outcome	At the end of the course students will be able to
CO1	Solid Foundation in C Programming
CO2	Advanced Problem-Solving Skills in C
CO3	Competence in C++ and Object-Oriented Programming
CO4	Ability to Apply Programming Knowledge Practically

Course Articulation Matrix

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1					2		3	3	3				
CO2	1					2		3	3	3				
CO3	1					2		3	3	3				
CO4	1					2		3	3	3				

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Let Us C by Yashavant Kanetkar	Yashavant Kanetkar	ISBN-10: 8183331637 ISBN-13: 978-8183331630
2	Let Us C++ by Yashavant Kanetkar	Yashavant Kanetkar	ISBN-10: 818333167X ISBN-13: 978-8183331678

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	The C Programming Language by Brian W. Kernighan and Dennis M. Ritchie	Dennis M. Ritchie	ISBN-10: 0131103628 ISBN-13: 978-0131103627
2	C++ Primer by Stanley B. Lippman, Josée Lajoie, and Barbara E. Moo	Stanley B. Lippman	ISBN-10: 0321714113 ISBN-13: 978-0321714114

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