

**DISCRETE MATHEMATICS & GRAPH THEORY**

<b>Course</b>	<b>B.Tech.-IV-Sem.</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Subject Code</b>	<b>22ES41</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>3</b>

**Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)**

COs	Upon completion of course the students will be able to	PO1	PO2	PO12
CO1	verify logical statements using connectives	3	3	2
CO2	validate arguments using predicate calculus	3	3	2
CO3	perform various operations with relational algebra	3	3	2
CO4	solve problems using combinatorics	3	3	2
CO5	simplify real-life situations using graph theory	3	3	3

**Syllabus**

Unit	Title/Topics	Hours
<b>I</b>	<b>Mathematical logic</b>	<b>10</b>
Introduction, statements and notation, connectives, well-formed formulas, tautologies, equivalence of formulas, duality law, functionally complete set of connectives, other connectives. <i>Task: Write a program to implement connectives: AND, NAND, OR, NOT, XOR, NOR.</i>		
<b>II</b>	<b>Predicate Calculus</b>	<b>9</b>
Normal forms, rules of inference, automatic theorem proving, predicate calculus, mathematical induction. <i>Task: Write a program to implement principle normal forms.</i>		
<b>III</b>	<b>Set theory, Relations and Functions</b>	<b>5+5=10</b>
<b>Part-A: Set theory:</b> Basic concepts, representation of sets, operations on sets, principles of inclusion and exclusion. <i>Task: Write a program to implement various set operations.</i>		
<b>Part-B: Relations and Functions:</b> Relations and ordering, properties of binary relation, functions, partial ordered set, lattice. <i>Task: Write a program for the following operations: a) reflexive b) symmetric c) Transitive.</i>		
<b>IV</b>	<b>Elementary Combinatory</b>	<b>10</b>
Basics of counting, combinations and permutations, enumeration of combinations and permutations, enumerating combinations and permutations with repetitions, pigeonhole principle. <i>Task: Write a program to implement Fibonacci sequence.</i>		
<b>V</b>	<b>Graph Theory</b>	<b>9</b>
Basic concepts, isomorphism and sub-graphs, planar graphs, Euler's formula, multi-graphs and Euler circuits, Hamiltonian graphs, chromatic numbers, the four-color problem. <i>Task: Write a program to implement Chromatic Number for a given graph.</i>		
<b>Textbooks</b>		
1. Discrete Mathematical Structures with Applications to Computer Science: J. P. Tremblay, R. Manohar, TMH, 1 <sup>st</sup> Edition. 2. Discrete Mathematics for Computer Scientists & Mathematicians: Joe I. Mott, Abraham Kandel, Theodore P. Baker, PHI, 2 <sup>nd</sup> Edition.		
<b>References</b>		
1. Discrete and Combinatorial Mathematics - an applied introduction: Ralph. P. Grimald, Pearson education, 5 <sup>th</sup> Edition. 2. Discrete Mathematical Structures: Thomas Kosy, TMH.		

**DESIGN AND ANALYSIS OF ALGORITHMS**

Course	B.Tech.-IV-Sem.	L	T	P	C
Subject Code	22CAPC41	3	-	-	3

**Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)**

COs	Upon completion of course the students will be able to	PO2	PO3	PO12	PSO1
CO1	measure time and space complexity of algorithms	3	3	3	3
CO2	solve problems using disjoint sets and divide-and-conquer techniques	3	3	2	2
CO3	apply greedy method and dynamic programming paradigm to solve the problems	3	3	2	2
CO4	adapt back-tracking and branch-bound methods to solve problems	3	3	2	2
CO5	interpret NP-hard and NP-complete problems	3	3	2	2

**Syllabus**

Unit	Title/Topics	Hours
<b>I</b>	<b>Introduction</b>	<b>8</b>
<b>Introduction:</b> Algorithm, pseudo code for expressing algorithms, performance analysis-space complexity, time complexity, asymptotic Notation: big-oh notation, omega notation, theta notation and little oh notation. <b>Task:</b> Program to perform operation count for a given pseudo code.		
<b>II</b>	<b>Disjoint Sets, Divide and Conquer</b>	<b>12</b>
<b>Disjoint Sets:</b> Disjoint set operations, UNION and FIND algorithms, spanning trees, connected components and biconnected components. <b>Divide and Conquer:</b> General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication. <b>Task:</b> Write a Binary Search Program for a given list of values recursively and non-recursively.		
<b>III</b>	<b>Greedy method and Dynamic Programming</b>	<b>4+6=10</b>
<b>Part-A: Greedy method:</b> General method, applications-Job sequencing with deadlines, knapsack problem, Minimum cost spanning trees, Single source shortest path problem. <b>Task:</b> Program to implement knapsack problem using greedy method.		
<b>Part-B: Dynamic Programming:</b> General method, applications - Optimal binary search trees, 0/1 knapsack problem, all pairs shortest path problem, Travelling salesperson problem, Reliability design. <b>Task:</b> Program for finding shortest path for multistage graph using dynamic programming.		
<b>IV</b>	<b>Backtracking</b>	<b>10</b>
<b>Backtracking:</b> General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles. <b>Branch and Bound:</b> General method, applications - Travelling salesperson problem, 0/1 knapsack problem, LC Branch and Bound solution, FIFO Branch and Bound solution. <b>Task:</b> Write a program to find the optimal profit of a Knapsack using Branch and Bound Technique.		
<b>V</b>	<b>NP-Hard and NP-Complete problems</b>	<b>8</b>
<b>NP-Hard and NP-Complete problems:</b> Basic concepts, non-deterministic algorithms, NP - Hard and NP Complete classes, Cook's theorem statement. <b>Task:</b> Write a program to color the nodes in a given graph such that no two adjacent can have the same color using backtracking.		
<b>Textbooks</b>		
1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekaran, Galgotia Publications Pvt. Ltd. 2. Introduction to Algorithms, 2 <sup>nd</sup> Edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest, and C.Stein, PHI Pvt. Ltd., Pearson Education.		
<b>References</b>		
1. Data structures and Algorithm Analysis in C++, Allen Weiss, 2 <sup>nd</sup> Edition, Pearson education. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.		

## COMPUTER NETWORKS

Course	B.Tech.-IV-Sem.	L	T	P	C
Subject Code	22CAPC42	3	-	-	3

## Course Outcomes (COs) &amp; CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO1	PO2	PO12	PSO1
CO1	outline the basics of computer networks and various layers	3	3	2	3
CO2	demonstrate multiple access protocols	3	3	2	3
CO3	interpret network layer and routing algorithms	3	3	3	3
CO4	illustrate internetworking and various transport protocols	3	3	3	3
CO5	make use of various protocols of application layer	3	3	2	3

## Syllabus

Unit	Title/Topics	Hours
I	Overview of the Internet, Physical layer and Data link layer	10
<b>Overview of the Internet:</b> Protocols and standards, Layering scenario, TCP/IP Protocol Suite, The OSI model, Internet history and administration, Comparison of the OSI and TCP/IP reference model. <b>Physical layer:</b> Transmission Media, Guided Media, wireless transmission Media. <b>Data link layer:</b> Design issues, CRC Codes, Elementary Data Link layer Protocols, sliding Window Protocol. <b>Task:</b> Write a program to compute CRC code for the polynomials.		
II	Multiple Access protocols	9
<b>Multiple Access protocols-</b> Aloha, CSMA, Collision free protocols, Ethernet –Physical layer, Ethernet Mac sub layer, Data link layer switching and use of bridges, learning bridges, Spanning tree bridges, repeaters, hubs, bridges, switches, routers and gateways. <b>Task:</b> Write a program for 1 bit collision free protocol.		
III	Network layer and Routing Algorithms	5+5=10
<b>Part-A: Network layer:</b> Network layer Design issues, store and forward packet switching connection less and connection oriented networks. <b>Task:</b> Write a program to implement i) Character stuffing ii) Bit stuffing.		
<b>Part-B: Routing Algorithms:</b> Optimality principle, shortest path, flooding, distance vector routing, count to infinity problem, hierarchical routing, congestion control algorithms and admission control. <b>Task:</b> Implement distance vector routing algorithm for obtaining routing tables at each node.		
IV	Internetworking and Transport Layer	9
<b>Internetworking:</b> Tunneling, internetwork Routing, Packet fragmentation, IPV4, IPV6 Protocol, IP addresses, CIDR, ICMP, ARP, RARP, DHCP. <b>Transport Layer:</b> Services provided to the upper layers elements of transport protocol-addressing connection establishment, connection release. <b>Task:</b> Write a program to demonstrate ARP.		
V	TCP/IP and Application Layer	10
<b>TCP/IP:</b> The internet Transport protocols UD-RPC, Real time Transport protocols, The internet Transport protocols-Introduction to TCP, The TCP services model, The TCP segment Header, The connection Establishment, The TCP Connection release, The TCP Connection management modeling, The TCP Sliding Window, The TCP Congestion Control. <b>Application Layer:</b> Introduction, Providing services, Applications layer paradigms, HTTP, FTP, electronic mail, DNS, SSH. <b>Task:</b> Write a program to implement RPC.		
<b>Textbooks:</b>		
1 Data Communications and Networking – Behrouz A Forouzan, Fourth Edition, TMH. 2 Computer Networks - Andrew S Tanenbaum, 4 <sup>th</sup> Edition. Pearson Education/PHI		
<b>References:</b>		
1. Introduction to Data communication and Networking, Tamasi, Pearson Education		

**OPERATING SYSTEMS**

<b>Course</b>	<b>B.Tech.-IV-Sem.</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Subject Code</b>	<b>22CAPC43</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>3</b>

**Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)**

COs	Upon completion of course the students will be able to	PO1	PO2	PO12
CO1	outline various concepts operating systems and Linux utilities	3	3	2
CO2	solve synchronization problems by using process management and APIs	3	3	2
CO3	adapt various deadlock handling and memory management mechanism	3	3	2
CO4	analyze various file management system	3	3	2
CO5	make use of I/O Management and security mechanisms	3	3	2

**Syllabus**

Unit	Title/Topics	Hours
<b>I</b>	<b>Operating Systems Overview and Operating Systems Structures</b>	<b>9</b>
<b>Operating Systems Overview:</b> Introduction, Operating System Objectives and functions, Evolution of operating System, operating system structure and services. <b>Basic Linux utilities and system calls:</b> File handling, Process utilities, Disk, Networking, Filters, Backup utilities, system calls-open, read, write, close.		
<b>II</b>	<b>Process Management, Concurrency and Synchronization</b>	<b>10</b>
<b>Process Management:</b> Process concepts creating process using fork, vfork system calls process state, process control block, scheduling queues, process scheduling, Threads Overview, Threading issues. <b>Concurrency and Synchronization:</b> Cooperating Processes, Inter-process Communication using pipes and fifo, Principles of Concurrency, Mutual Exclusion, Software and hardware approaches, Semaphores, Monitors, Message Passing, and Classic problems of synchronization.		
<b>III</b>	<b>Deadlocks and Memory Management</b>	<b>5+5=10</b>
<b>Part-A: Deadlocks:</b> System model, deadlock characterization, deadlock prevention, detection and avoidance, recovery from deadlock banker's algorithm. <b>Part-B: Memory Management:</b> Basic concepts, swapping, contiguous memory allocation, paging, structure of the page table, segmentation, virtual memory, demand paging, page-replacement algorithms, thrashing.		
<b>IV</b>	<b>File Management System</b>	<b>10</b>
<b>File Management System:</b> Concept of a file, access methods, directory structure, file system mounting, file sharing, protection. File system implementation: file system structure, file system implementation, directory implementation, allocation methods, free-space management, efficiency and performance.		
<b>V</b>	<b>I/O Management System, Protection and Security</b>	<b>9</b>
<b>I/O Management System:</b> Mass storage structure - overview of mass storage structure, disk structure, disk attachment, disk scheduling algorithms, swap space management, stable storage implementation, tertiary storage structure. <b>Protection &amp; Security:</b> Protection mechanisms, OS Security issues, threats, Intruders, Viruses.		
<b>Textbooks</b>		
1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, Operating System Principles, 10 <sup>th</sup> Edition, 2018, Wiley India Private Limited, New Delhi. 2. Internal and Design Principles, Stallings, 5 <sup>th</sup> Edition, 2005, Pearson education, PHI. 3. Unix Concepts and Applications, 4th edition, Sumitabha Das, TMH.		
<b>References</b>		
1. Andrew S. Tanenbaum, Modern Operating Systems, 2 <sup>nd</sup> Edition, 2007, PHI, India. 2. Unix System Programming using C++, T.Chan, PHI 3. Operating Systems – A concept based approach – DM Dhamdhare, 2 <sup>nd</sup> Edition, TMH.		

**FULL STACK DEVELOPMENT**

<b>Course</b>	<b>B.Tech.-IV-Sem.</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Subject Code</b>	<b>22CAPC44</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>3</b>

**Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)**

COs	Upon completion of course the students will be able to	PO2	PO3	PO6	PO12	PSO1
CO1	explain the concepts of HTML5 and version control	3	2	2	3	3
CO2	illustrate java script and jQuery concepts	3	2	2	3	3
CO3	use Node.js and MongoDB Driver for web development	3	3	3	3	3
CO4	develop app using Angular concepts	3	3	3	3	3
CO5	design app using ReactJS concepts	3	2	3	3	3

**Syllabus**

Unit	Title/Topics	Hours
<b>I</b>	<b>HTML5 &amp; Version Control</b>	<b>9</b>
<b>HTML5:</b> Video & Audio, SVG, Web Storage, Drag & Drop, Geo Location. Styling using css, Bootstrap - Setup, Templates. <b>Version Control:</b> Getting Started with Git, Working with A Local Repository, Branches and Merging, Working with Remote Repository.		
<b>II</b>	<b>Java script &amp; jQuery</b>	<b>10</b>
<b>Java script:</b> Variables, Arrays, Objects, Loops, Conditionals, Switches, Functions, Events, Form validating, Ajax. <b>jQuery:</b> Selectors & Mouse events, Form events, DOM Manipulation, Effects & Animation, Traversing & Filtering.		
<b>III</b>	<b>Node.js &amp; MongoDB</b>	<b>5+4=9</b>
<b>Part-A: Node.js:</b> Getting Started With Node, Installation Node Js, Simple Server, Project using Simple Node Server, Express Setup and Routing, Middleware Password Encryption, Login Functionality, JWT.		
<b>Part-B:</b> Install MongoDB, Data Modeling, Query and Projection, Aggregation Pipeline.		
<b>IV</b>	<b>Angular</b>	<b>10</b>
Getting Started with angular, angular app from scratch, components & properties, events & binding with ngModel, fetch data from a service, submit data to service, http module & observables, routing.		
<b>V</b>	<b>React JS</b>	<b>10</b>
Install React JS, create-react-app, React Router, React Components, State, Props, React Forms, Component Life-Cycle, React Redux, Angular vs React JS.		
<b>Textbooks</b>		
<ol style="list-style-type: none"> <li>1. HTML 5 Black Book, Covers CSS 3, JavaScript, XML, XHTML, AJAX, PHP and jQuery, 2<sup>nd</sup> Ed. Paperback - 1 January 2016. (<a href="https://www.amazon.in/Black-Covers-JavaScript-XHTML-jQuery/dp/935119907X">https://www.amazon.in/Black-Covers-JavaScript-XHTML-jQuery/dp/935119907X</a>)</li> <li>2. The Full Stack Developer: Your Essential Guide to the Everyday Skills Expected of a Modern Full Stack Web Developer Paperback – Import, 20 November 2018. (<a href="https://www.amazon.in/Full-Stack-Developer-Essential-Everyday/dp/1484241517">https://www.amazon.in/Full-Stack-Developer-Essential-Everyday/dp/1484241517</a>)</li> <li>3. Learning Node.js Development: Learn the fundamentals of Node.js, and deploy and test Node.js applications on the web Paperback – Import, 31 January 2018. (<a href="https://www.amazon.in/Learning-Node-js-Development-fundamentals-applications/dp/1788395549">https://www.amazon.in/Learning-Node-js-Development-fundamentals-applications/dp/1788395549</a>)</li> <li>4. Angular 14 from Scratch. (<a href="https://leanpub.com/book-angular">https://leanpub.com/book-angular</a>)</li> <li>5. Full-Stack React Projects: Learn MERN stack development by building modern web apps using MongoDB, Express, React, and Node.js, 2<sup>nd</sup> Edition Paperback – Import, 17 April 2020. (<a href="https://www.amazon.in/Full-Stack-React-Projects-development-building/dp/1839215410">https://www.amazon.in/Full-Stack-React-Projects-development-building/dp/1839215410</a>)</li> </ol>		
<b>Web References</b>		
<ol style="list-style-type: none"> <li>1. Git: <a href="https://git-scm.com/">https://git-scm.com/</a> Github: <a href="https://github.com/">https://github.com/</a></li> <li>2. HTML: <a href="https://developer.mozilla.org/en-US/docs/Web/HTML">https://developer.mozilla.org/en-US/docs/Web/HTML</a></li> <li>3. Javascript: <a href="https://developer.mozilla.org/en-US/docs/Web/JavaScript">https://developer.mozilla.org/en-US/docs/Web/JavaScript</a></li> <li>4. Node: <a href="https://nodejs.org/en/">https://nodejs.org/en/</a> MongoDB: <a href="https://www.mongodb.com/try/download/community">https://www.mongodb.com/try/download/community</a></li> <li>5. Angular: <a href="https://angular.io/">https://angular.io/</a> React JS: <a href="https://reactjs.org/">https://reactjs.org/</a></li> </ol>		



**CN & OS (LINUX) LAB**

<b>Course</b>	<b>B.Tech.-IV-Sem.</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Course Code</b>	<b>22CAPC45</b>	-	-	2	1

**Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)**

COs	Upon completion of course the students will be able to	PO3	PO5	PO9	PSO2
CO1	implement datalink protocols	3	3	3	3
CO2	find shortest path using routing table	3	3	3	3
CO3	illustrate Linux shell environment	3	3	3	3
CO4	interpret CPU scheduling algorithms and file allocation methods	3	3	3	3
CO5	experiment with page replacement and memory management	3	3	3	3

**List of Experiments**

Week	Title/Experiment
1	Implement the data link layer framing method using character stuffing and bit stuffing.
2	Implement CRC on a data set of characters using CRC-12 / CRC-16 polynomial.
3	Implement Stop and Wait Protocol.
4	Implement Sliding Window Protocol.
5	Implement Dijkstra's shortest path algorithm through a graph.
6	Obtain broadcast tree for given subnet of hosts.
7	Implement collision free protocol.
8	a) Study of Linux general purpose utilities (File handling, Process, Disk, Networking, Filters) b) Implement Linux commands i) CP ii) MV
9	a) Write a shell script to find factorial of a given integer. b) Write a C program to create a child process and allow parent to display 'parent' and child to display 'child'. c) Write a C program in which a parent writes a message to a pipe and the child reads the message.
10	Write C programs to simulate the following CPU scheduling algorithms a) FCFS b) Priority
11	Write C programs to simulate the following CPU scheduling algorithms a) SJF b) RR
12	Write C programs to simulate the following file allocation strategies a) Sequential b) Linked c) Indexed
13	Write C programs to simulate the following memory management techniques a) Paging b) Segmentation
14	Write C programs to simulate the following page replacement techniques: a) FIFO b) LRU c) Optimal

**References**

1. CN & OS (Linux) Lab Manual, Department of CSE (AI&ML), CMRIT, Hyd.

**Micro-Projects:** Student should submit a report on one of the following/any other micro-project(s) approved by the lab faculty before commencement of lab internal examination.

1. Peer to Peer File Sharing Technology over LANs.
2. Client-Server based Instant Messenger.
3. Network Design Proposal for an Institution.
4. Simulate ARP / RARP protocols using NS2/NS3 tools.
5. Producer-Consumer problem using semaphores.
6. Dining-Philosopher problem using semaphores.
7. Readers-Writers problem using semaphores.
8. Implement DAG (Directed Acyclic Graph) file organization technique.
9. Simulate multi-level queue CPU scheduling algorithm.
10. Implement Matrix Multiplication using pthreads.

**NODE JS/ANGULAR/REACT JS/DJANGO**

<b>Course</b>	<b>B.Tech.-IV-Sem.</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Course Code</b>	<b>22CAPC46</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>1</b>

**Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)**

COs	Upon completion of course the students will be able to	PO4	PO5	PO9	PO12	PSO2
CO1	build website with HTML5, CSS, Bootstrap and JavaScript	3	3	3	3	3
CO2	demonstrate JavaScript using NodeJS and MongoDB	3	3	3	3	3
CO3	develop single page application using Angular	3	3	3	3	3
CO4	develop single page application using React JS	3	3	3	3	3
CO5	design web application using Django	3	3	3	3	3

**List of Experiments**

Week	Title/Experiment
1	Demonstrate version control in Git and Github using simple html code.
2	Design a simple webpage using bootstrap template.
3	Write a java script code to validate user registration and login form.
4	Write a jquery code to show website slider.
5	Create a simple Node.js server with routes login, register, profile and logout.
6	Write middleware to validate users and generate JWT.
7	Write middleware to validate JWT and redirect to profile.
8	Write MongoDB model for the user and query to fetch user, validate and register.
9	Design a Single Page Application with different menu items using Angular.
10	Fetch user details from server using REST API and show in profile menu using Angular.
11	Design Single Page Application with different menu items using react.
12	Install Django and setup a virtual environment.
13	Design Web Application with different menu items using Django.
14	Fetch user details from server using REST API and show in profile menu using Django.
<b>References</b>	
1. Node JS/Angular/React JS/Django Manual, Dept. of CSE (AI&ML), CMRIT, Hyd.	
<b>Micro-Projects:</b> Student should submit a report on one of the following/any other micro-project(s) approved by the lab faculty before commencement of lab internal examination.	
1. Online Gift Store. 2. Online Pharmacy Store. 3. Online Cake Store. 4. Online Medicine Store. 5. Electronic Shop Management System. 6. Employee Management System. 7. Asset Management System. 8. Online Supermarket Store. 9. E-Farming Portal. 10. College Management System.	

**AUTOMATED TESTING TOOLS - SELENIUM**

<b>Course</b>	<b>B.Tech.- IV-Sem.</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Course Code</b>	<b>22CAPC47</b>	-	-	2	1

**Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)**

COs	Upon completion of course the students will be able to	PO3	PO4	PO5	PO8	PO9	PO12	PSO2
CO1	install JAVA, Associate SWD Jars and Browser drivers	3	3	3	3	3	3	3
CO2	devise website issues using automation	3	3	3	3	3	3	3
CO3	develop programs using web drivers	3	3	3	3	3	3	3
CO4	design test cases for validation of data	3	3	3	3	3	3	3
CO5	plan automation to address real time problems	3	3	3	3	3	3	3

**List of Experiments**

Week	Title/Experiment
1	Download and Install JAVA, Associate SWD Jars and Browser drivers.
2	Launch Mercury Tour website a) Click Register link to get registration page      b) Fill fields c) Click submit      d) Close site
3	Write a code to search a specific month in the Facebook registration page (Birthday).
4	Write a program which pops out an alert message in frame in personal banking login page.
5	Write a test case to search result section on CMRIT Website.
6	Write a test case to perform automation on AJIO shopping website.
7	Write a program in web driver to open Google and search CMRIT.
8	Write a test case to open Google and download an image from Google images of CMRIT website.
9	Write a test case to get number of list items in a list.
10	Write a test case for validation in Gmail registration page.
11	Write a test case for Myntra sign in page.
12	Write a test case to convert PDF from word.

**References**

1. Automated Testing Tools - Selenium Manual, Department of CSE (AI&ML), CMRIT, Hyd.

**Micro-Projects:** Student should submit a report on one of the following/any other micro-project(s) approved by the lab faculty before commencement of lab internal examination.

1. Perform automation testing for any hotel booking website.
2. Perform automation testing for shopping cart.
3. Perform automation testing for utility bill payment portal.
4. Perform automation testing for travel booking website.
5. Perform automation testing for finding out list of employees having salaries greater than a specific amount.
6. Perform automation testing to find out total number of objects in Google search result with a specific query.
7. Perform automation testing for EMI calculator.
8. Perform automation testing for finding out the number of flights departing from Hyderabad airport in a day.
9. Perform automation testing for finding out the least and highest cost for a specific product in any e-commerce website.
10. Perform automation testing for voice based input in Google search engine.



**REAL TIME/SOCIETAL RESEARCH PROJECT**

<b>Course</b>	<b>B.Tech.-IV-Sem.</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Subject Code</b>	<b>22CAPR41</b>	<b>-</b>	<b>-</b>	<b>4</b>	<b>2</b>

**Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)**

<b>COs</b>	<b>Upon completion of course the students will be able to</b>	<b>PO1 to PSO2</b>
<b>CO1</b>	identify relevant problem and design & develop a prototype	3
<b>CO2</b>	execute project using modern tools and prepare the report	3
<b>CO3</b>	exhibit leadership and managerial skills in project development	3
<b>CO4</b>	function effectively as individual, member and/or leader in project teams	3
<b>CO5</b>	apply engineering knowledge for societal sustenance	3

**Guidelines**

The main aim of the project is to expose the students to solve societal/real-time issues as an individual or as a group of 3-4 students and work under the guidance of faculty/industry supervisor.

S. No.	Title
1	Prepare an abstract on the approved topic and submit to the Guide/Supervisor.
2	Conduct literature survey on the approved project title.
3	Analyze collected data, model, simulation, experiment, design and test project feasibility.
4	Prepare a Gantt chart for project schedule to conduct investigations with team.
5	Design and develop a prototype, simulate and test-facility by using modern tools.
6	Document end-to-end project/product process.
7	Submit a report in the prescribed format through the Guide to Head of the Department.
8	Demonstrate Project work before the Evaluation Committee.
Evaluation Procedure	
CIE: 40 Marks	
SEE: 60 Marks	
Internal Guide Evaluation	
Department Review Committee Evaluation	
Item	Marks
Item	Marks
Societal Problem Identification	05
Objectives	05
Literature Survey	05
Design and Execution	10
Viva-Voce (Q & A)	05
Project Report	10
Total	40
Total	60

## INDIAN CULTURE AND CONSTITUTION MANDATORY COURSE (NON-CREDIT)

Course	B.Tech.-IV-Sem.	L	T	P	C
Subject Code	22MC41	2	-	-	-

### Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO8	PO12
CO1	identify paradigm shift in indian culture	3	1
CO2	explain features of languages, religions and holy books	3	2
CO3	illustrate provisions of Indian constitution	3	3
CO4	appreciate the structure of Indian administration system	3	3
CO5	appraise the role of Election Commission of India	3	2

### Syllabus

Unit	Title/Topics	Hours
<b>I</b>	<b>Indian Culture</b>	<b>10</b>
<b>Indian Culture:</b> Characteristics of Indian culture, significance of geography on Indian culture, society in India through ages, religions in ancient period, caste system, communalism and modes of cultural exchange. <b>Task:</b> Perform a case study on cultural migration.		
<b>II</b>	<b>Indian Languages, Religions and Literature</b>	<b>9</b>
<b>Indian Languages, Religions and Literature:</b> Evolution of script and languages in India, the Vedas and holy books of various religions. Religion and philosophy in India; ancient period - Pre-Vedic, Vedic religion, Buddhism and Jainism. <b>Task:</b> Perform a case study on any unscripted languages in India.		
<b>III</b>	<b>Indian Constitution and Union Administration</b>	<b>5+5=10</b>
<b>Part A: Indian Constitution:</b> Constitution' meaning of the term, Indian Constitution: Sources and constitutional history, Features: Citizenship, Fundamental Rights and Duties. <b>Task:</b> Perform a case study on implementation of Fundamental Rights.		
<b>Part B: Union Administration:</b> Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha. <b>Task:</b> Perform a case study on Federalism and red-tape.		
<b>IV</b>	<b>State and District Administration</b>	<b>10</b>
<b>State Administration:</b> Governor: Role and Position, CM and Council of ministers, State Secretariat: Structure and functions Election Commission: Role and Functioning. <b>District's Administration:</b> Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation. <b>Task:</b> Perform a case study on limitations of democratic chair/position.		
<b>V</b>	<b>Local Administration and Election Commission</b>	<b>9</b>
<b>Local Administration:</b> Introduction to local self-government, Organizational Hierarchy (Different departments), ZP administration, Mandal level and Village level administration. <b>Election Commission:</b> Role, structure and Functions of Election Commission of India. Introduction to different welfare boards. <b>Task:</b> Perform a case study on functional difference between state & central Election Commission.		
<b>Reference</b>		
1. A Hand Book on Indian Culture and Constitution, FED, CMRIT, Hyderabad.		

## EMPLOYABILITY SKILLS – II

### MANDATORY COURSE (NON-CREDIT)

Course	B.Tech.-IV-Sem.	L	T	P	C
Subject Code	22MC42	-	-	3	-

#### Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO9	PO10
CO1	make use of soft skills to become a professional team member	3	3
CO2	develop professional correspondence skills	3	3
CO3	apply knowledge of decision making, leadership, motivation	3	3
CO4	adapt principles of quantitative aptitude to achieve qualitative results	3	3
CO5	exhibit confidence in facing the interview process	3	3

#### List of Experiments

Week	Title/Experiment
1	<b>Soft skills:</b> Introduction to Soft Skills and Their Importance. <b>Aptitude:</b> Statements - Arguments, Assumptions, Conclusions. <b>Ratio and Proportion:</b> Basic concepts of ratio and proportion, continued or equal proportions, mean proportions, invest proportion, alternative proportion.
2	<b>Soft skills:</b> Self awareness and Self esteem Assertions & Reasons. <b>Aptitude: Ratio and Proportion:</b> Division proportion, compound proportion, duplication of ratio, finding values, coins and currencies, etc.
3	<b>Soft skills:</b> Discipline, Integrity, Attitude, Change and Adaptability. <b>People Skills - Relationships - Personal &amp; Professional Relationships - Rapport Building - Personal Space.</b> <b>Aptitude: Speed, Time and Distance:</b> Basic Concepts, Single train problems, two train problems: some point on the same side.
4	<b>Soft skills:</b> Definition of Motivation - Motivation - Self-motivation; Time Management - Stephen Covey's Time Management. <b>Aptitude: Speed, Time and Distance:</b> Some point opposite sides, relative speed, different points meeting at common points, different points same side (different timings vs. same timings).
5	<b>Soft skills: Teamwork - Definition of Team, Team Dynamics - Specialization and Teamwork - Rewards of Teamwork.</b> <b>Aptitude: Speed, Time and Distance:</b> Ratios, number of stoppages, average speed, etc.
6	<b>Soft skills: Leadership - Definition of Leadership, Leading a Team, Leadership Qualities - Leader vs. Manager - Leadership Styles.</b> <b>Aptitude: Time and Work:</b> Basic Concepts, comparative work, mixed work, alternative work, middle leave and middle join ratio efficiency. <b>Gamification - The Same Rule.</b>
7	<b>Soft skills: Problem Solving and Decision Making - Definitions - Problem Solving and Decision Making - Case Studies.</b> <b>Aptitude: Permutations and combinations:</b> Basic concepts, differences between permutations and combinations, always together-never together, alternative arrangement, fixed positions, double fixations.
8	<b>Soft skills: Conflict Management - Definitions - Strategies - Styles - Case Studies.</b> <b>Aptitude: Permutations and combinations:</b> items drawing from a single group, items drawing from a multiple group, total ways of arrangement with repetitions and without repetitions.
9	<b>Soft skills: Preparation for Interviews - Self Introduction - Professional Context, Pre-Interview Preparation Techniques, Analyzing Skills &amp; Achievements, Researching the Industry and the Organization.</b> <b>Aptitude: Permutations and combinations:</b> Dictionary, handshakes or line joining between two points or number of matches, sides and diagonals, etc.

10	<b>Soft skills:</b> Develop the Interview File - Resume Building -Types of Interviews. <b>Aptitude: Clocks and Calendars:</b> Basic Concepts, Angle between minute hand and hour hand, reflex angle, hours hand angle, time gap between minute hand and hour hand, relative time: coincide.
11	<b>Soft skills:</b> First Impressions - Body Language - Posture - Dressing and Grooming- Dos and Don'ts of an Interview. <b>Aptitude: Clocks and Calendars:</b> Basic opposite sides and right angle, mirror images, faulty clock (slow/fast), miscellaneous, calendar.
12	<b>Soft skills:</b> Interview Practice/Mock Interviews - FAQ's <b>Aptitude: Geometry and Mensuration:</b> Basic concepts, types of angles.
13	<b>Soft skills: Presentation</b> - Oral Presentation - Individual - Group - Poster. <b>Aptitude: Plane figures:</b> rectangles, squares, triangles, quadrilateral, areas, perimeters, etc. <b>Solid figures:</b> cubes, cuboids, cylinders-area (total surface area and lateral surface area). <b>Gamification</b> - Overall Revision.
14	<b>Soft skills: Presentation Skills</b> - How to Present a Project Effectively - PowerPoint Presentations. <b>Aptitude: Solid figures:</b> Volumes, perimeters. <b>Others:</b> Parallelogram, Rhombus, Trapezium, Circle, Sector, Segment, Cone, Sphere, Hemisphere, etc.
<b>Activities</b>	
1. Regular cumulative practice tests. 2. Quiz, Crossword, Word-search and related activities. 3. Five - minute presentations about concepts learnt. 4. JAM and Picture Narration. 5. Mock Interviews.	
<b>Reference</b>	
1. Employability Skills - II Manual, FED, CMRIT, Hyd.	