



An Autonomous Institute
Shree Warana Vibhag Shikshan Mandal's
**Tatyasaheb Kore Institute of
Engineering And Technology,
Warananagar**

Department of Computer Science & Engineering

**Second Year
Bachelor of Technology (B. Tech)
in
Computer Science & Engineering**

**S.Y.B.Tech. (Sem-III) Computer Science & Engineering
Syllabus Structure and Curriculum as per NEP 2020**

Tatyasaheb Kore Institute of Engineering and Technology, Warananagar

An Autonomous Institute

Department of Computer Science & Engineering

Vision

To become center of excellence in the field of Computer Science and Engineering and develop competent IT technocrats

Mission

- To develop engineering graduates with high degree of professional excellence
- To excel in academics and research through contemporary and real world problems
- To enhance graduate employability through work based learning in social entrepreneurship
- To encourage industrial and nationally recognized institutes collaboration
- To create an environment to nurture lifelong learning

Program Educational Objectives (PEOs)

Graduates will be,

- Able to design and develop computing system using modern technologies by adapting business intelligence and challenges.
- Able to acquire capabilities with aptitude for higher education and entrepreneurship
- Able to function effectively as professionals having excellent interpersonal skills with ethical and social obligations.
- Able to work efficiently in multidisciplinary and multicultural environment
- Able to lead in their respective domain and contribute positively to the needs of society.

Program Specific Outcomes (PEOs)

Graduate will be able to

- Identify, design and develop solution for real world problems by implementing phases of software development process model
- Analyze and apply the computer science engineering solutions in societal and human context
- Demonstrate the skills and knowledge of contemporary issues in the field of Computer science and Engineering

Quality Policy

- To promote excellence in academic and training activities by inspiring students for becoming competent professionals to cater industrial and social needs.

SWVSM'S
Tatyasaheb Kore Institute of Engineering and Technology, Warananagar
An Autonomous Institute

Abbreviations

S N	Acronym	Definition
1	ISE	In-Semester Examination
2	ESE	End-Semester Examination
3	ISA	In-Semester Assessment (Term Work)
4	L	Lecture
5	T	Tutorial
6	P	Practical
7	CH	Contact Hours
8	C	Credits

Course Bucket Terminologies

Sr. No.	Acronym	Definition
1	PCC	Professional Core Course
2	MDM	Multidisciplinary Minor
3	OE	Open Elective Course
4	HSSM	Humanities Social Science and Management
5	ELC	Experiential Learning Course
6	VSEC	Vocational and Skill Enhancement Course
7	AEC	Ability Enhancement Course

Course/ Subject Code

F.Y.B.Tech Syllabus change year	UG/PG	Course Category with number	Separator	Branch	Semester	Course Number	
23	UG	PCC	-	CSE	3	0	1

Course Term work and POE Code

CSE	3	0	1	T / P / A
Branch	Semester	Course Number		T - Term work P - POE A - Audit Course

Second Year B.Tech
(Semester-III)
in
Computer Science and Engineering
Syllabus Structure and Curriculum
as per NEP 2020



SWVSM's
**Tatyasaheb Kore Institute of Engineering and
Technology (Autonomous), Warananagar**
Second Year B. Tech. (Computer Science and Engineering)
Semester-III
(To be implemented from 2024 - 25)
Credit Scheme as per NEP

Sr. No	Category	Sub-Category	Course Code	Course Title	Teaching Scheme					Examination & Evaluation Scheme			
					L	T	P	C	CH	Component	Marks	Min Marks for Passing	
1	Program Core Course	PCC	23UG-PCC-CSE301	Mathematics for Computer Science	3	--	--	2	3	ISE	40	16	40
										ESE	60	24	
2		PCC	23UG-PCC-CSE302	Digital System & Microprocessor	2	--	--	2	2	ISE	40	16	40
										ESE	60	24	
3		PCC	23UG-PCC-CSE303	Data Structures	3	--	--	2	3	ISE	40	16	40
									ESE	60	24		
4	PCC	23UG-PCC-CSE304	Software Engineering	2	--	--	2	2	ISE	40	16	40	
									ESE	60	24		
5	PCC	23UG-PCC-CSE305	Discrete Mathematical Structures	2	--	--	2	2	ISE	40	16	40	
									ESE	60	24		
6	Multi-Disciplinary Course	MDM-1	23UG-MDM1-CSE306	Statistical Computing	2	--	--	2	2	ISA (TW)	50	20	20
7	Humanities Social Science and Management	Entrepreneurship/Economics/Mgmt. Course	23UG-EEC1-CSE307-1	Entrepreneurship Management	2	--	--	2	2	ISA (TW)	25	10	30
8		Value Education Course	23UG-VEC1-CSE308-1	Object Oriented Programming using C++	2**	--	2	1	4	ISA (TW)	25	10	
									ESE (POE)	50	20		
9	Experiential Learning Courses	Community Engg Project (CEP/FP)	23UG-CEP-CSE309	Field Project	1	--	2	2	3	ISA (TW)	25	10	10
10	Program Core Courses	PCC	23UG-PCC-CSE303P	Data Structures Lab	--	--	4	2	4	ISA (TW)	25	10	20
										ESE (POE)	25	10	
11		PCC	23UG-PCC-CSE302P	Digital Systems & Microprocessors Lab	--	--	2	1	2	ISA (TW)	25	10	20
									ESE (OE)	25	10		
12	PCC	23UG-PCC-CSE305T	Discrete Mathematical Structures	--	1	--	1	1	ISA (TW)	25	10	10	
					19	1	10	21	30	--	800	320	320

Note : (1) **Additional contact hours are provided for the courses without any credit
(2) In theory examination there will be separate passing for ESE and ISE



Humanities Social Science and Management (HSSM) Course Basket Sem –III			
Entrepreneurship / Economics Course (EEC-1)			
Category	Sub Category	Course Code	Name of Course
Humanities Social Science and Management	EEC - 1	23UG-EEC1-CSE307-1	Entrepreneurship Management
		23UG-EEC1-CSE307-2	Computer Science and Economics
		23UG-EEC1-CSE307-3	IT Project Management
Value Education Course (VEC-1)			
Category	Sub Category	Course Code	Name of Course
Humanities Social Science and Management	VEC-1	23UG-VEC1-CSE308-1	Object Oriented Programming using C++
		23UG-VEC1-CSE308-2	Problem Solving using C
		23UG-VEC1-CSE308-3	Embedded C



23UG-PCC-CSE301- Mathematics for Computer Science

[Click for Syllabus Structure](#)

Teaching Scheme
Lectures : 3 Hrs/Week
Credits : 2

Evaluation Scheme
ISE : 40 Marks
ESE : 60 Marks

Course Objective :		
1	To develop mathematical skills and enhance analytical power of students.	
2	To prepare students to analyze data using statistical methods & interpret the solution in real world.	
3	To give the knowledge to the students of fuzzy set theory and Numerical methods.	
Course Outcomes :		
COs	At the end of successful completion of the course, the students will be able to	Bloom's Taxonomy
CO1	Describe statistical data using statistical concepts, regression lines and curve fitting techniques.	Understand
CO2	Use Binomial, Poisson and Normal distributions to find probabilities.	Apply
CO3	Test hypotheses, examine data and make statistically significant inferences from the results.	Evaluate
CO4	Understand the basic ideas of fuzzy sets, operations and properties of fuzzy sets	Understand
CO5	Solve algebraic and transcendental equations using numerical methods.	Apply

Course Description :		
This course provides a comprehensive introduction to the fundamental concepts and techniques in statistics. It covers essential topics such as measures of central tendency, measures of dispersion, correlation and regression analysis, probability distributions, statistical inference, fuzzy sets, and numerical methods. The course is designed to equip students with the necessary statistical tools to analyze and interpret data effectively.		
Prerequisites :	1	Basic Algebra, Basic Arithmetic, Number series
	2	Probability fundamentals
	3	Set theory
Section – I		
Unit-1	Introduction to Statistics	08 Hours
	Revision of basic definitions/concepts, Measures of central tendency: Arithmetic Mean (A.M.), Median, Mode, Combined Mean, Measures of Dispersion :Range, Quartile deviation, Mean deviation Standard deviation as Absolute measures of dispersion, Coefficient of range, quartile deviation, mean deviation, Coefficient of variation as Relative measures of dispersion	
Unit-2	Correlation, Regression & Curve Fitting	



	Introduction , Karl Pearson's Coefficient of Correlation, Lines of regression of bivariate data, Fitting of Curves by method of Least-squares: Fitting of Straight lines, Fitting of exponential curves, Fitting of second degree Parabolic curves	08 Hours
Unit-3	Probability Distribution	07 Hours
	Random variables, Discrete Probability distribution, Continuous probability distribution, Binomial Distribution, Poisson Distribution, Normal Distribution.	
Section – II		
Unit-4	Statistical Inference-Test of Hypothesis	06 Hours
	Introduction, Null Hypothesis, Alternate Hypothesis, Statistic, Critical Region, Errors in testing, Level of Significance, Test for population mean, equality of population means population proportion & equality of population proportions, Test of significance for small samples: t- test, Chi- Square Test, Test of significance for large samples.	
Unit-5	Introduction to Fuzzy sets	07 Hours
	Introduction, Definition of Fuzzy set, Membership function, Difference between Crisp set and Fuzzy set, Basic concepts of fuzzy sets, Basic operations on fuzzy sets, Properties of fuzzy sets.	
Unit-6	Numerical Methods and Number series	06 Hours
	Numerical solution of algebraic and transcendental equations: Bisection Method, Newton Raphson Method, Secant Method, Method of successive approximations Number Series revision : Arithmetic Series , Geometric series & Harmonic Series	

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	--	1	--	--	--	--	--	--	--	1
CO2	3	2	--	1	--	--	--	--	--	--	--	1
CO3	3	2	--	--	--	--	--	--	--	--	--	1
CO4	3	1	--	--	--	--	--	--	--	--	--	1
CO5	3	1	--	--	--	--	--	--	--	--	--	1



References	
Text Books :	
1	Higher Engineering Mathematics, Dr. B. S. Grewal, Khanna Publishers, Delhi, 42 nd Edition, 2012
2	A text book of Engineering Mathematics, N. P. Bali, Iyengar Laxmi Publications (P) Ltd., New Delhi 9 th Edition (2014)
Reference Books :	
1	Statistical Methods, S. P. Gupta, Sultan Chand & Sons
2	Numerical methods, Dr. B. S. Grewal, Khanna Publishers, Delhi
3	Probability and Statistics, John Schiller, Murray R. Spiegel, Schaum's outlines.
4	Fuzzy Sets and Fuzzy Logic: Theory and Applications George J. Klir and Bo Yuan, Prentice Hall 1995
SWAYAM Courses (Operational Timestamp: Thu, 25-Jul-2024 on 7:00 AM)	
1	https://nptel.ac.in/courses/102101056 (Unit 1 to Unit 4)
2	https://nptel.ac.in/courses/111102130 (Unit 5)
3	https://nptel.ac.in/courses/122102009 (Unit 6)



23UG-PCC-CSE302–Digital System and Microprocessor

[Click for Syllabus Structure](#)

Teaching Scheme
Lectures : 2 Hrs/Week
Credits : 2

Evaluation Scheme
ISE : 40 Marks
ESE : 60 Marks

Course Objective :		
1	To study and perform arithmetic operations on number system.	
2	Introduce the basics of Minimizing Boolean functions by using various techniques like K-Map method and implement by using suitable Logic gates and MSI chips.	
3	To understand the functionality and design of Combinational and Sequential logic Circuits.	
4	To overview of microcomputer System and Programming Model of 8086 microprocessors.	
5	To write and execute the assembly language programs using 8086 Instruction sets.	
Course Outcomes :		
COs	At the end of successful completion of the course, the students will be able to	Bloom's Taxonomy
CO1	Perform the Number conversions ,Realization of basic logic gates, digital arithmetic and various reduction techniques of digital logic circuit	Understand
CO2	Design and implementation of Combinational and Sequential logic circuit	Apply
CO3	Interpret the architecture of the 8086 microprocessor, addressing modes and Assembler directives	Understand
CO4	Demonstrate of the various instructions set in 8086 microprocessor.	Understand
CO5	Write and Execute Assembly Language Program for given problems.	Apply

Course Description :			
This Course is designed to realize the standard building blocks of digital system and microprocessor.			
Prerequisites :	1	Engineering Mathematics-I [23FY102]	
	2	Computer Programming in C [23FY111]	
Section – I			
Unit-1	Number System and Digital Arithmetic		05 Hours
	Number Conversion & Codes: Binary to Decimal, Decimal to Binary, Octal Number System, Hexadecimal Number System, Binary Codes, and Alphanumeric Codes. Binary Addition, Representing Signed Numbers, and Addition in 2'S Compliment System, Subtraction in 2'S Compliment System, Binary Multiplication, Binary Division, BCD Addition, and Hexadecimal Arithmetic		



Unit-2	Basic Logic Circuits	05 Hours
	Logic Circuits: Truth Tables, OR Operation with OR Gate, AND Operation with AND Gate, NOT Gate, Exclusive-OR, Exclusive-NOR Gate and Universal Gates. Describing, Evaluation & Implementing of Logic Circuits Algebraically, Boolean Theorems, Sum of Product forms, Algebraic Simplification, Karnaugh Map Method ,De-Morgan's Theorems	
Unit-3	Combinational and Sequential Logic Circuits	05 Hours
	Definition of Combinational logic: Adder, Subtractor, Encoder, Decoder, Multiplexer, Demultiplexer, Sequential Logic: Clocked S-R Flip Flops, Clocked J-K Flip Flops, Clocked D Flip Flops, D-Latch. Parity Generator and Checker, Application of Flip flops. Registers, Counters, Shift Registers. Ripple Counters.	
Section – II		
Unit-4	Microcomputers and 8086 Microprocessor	05 Hours
	Overview of Microcomputers System: Hardware, Software, Address, General Operation of Computers, addressing modes 8086 Architecture: CPU Architecture, Internal operations. Programming Model of Microprocessor, Real Mode Memory	
Unit-5	8086 Assembly Language Programming-I	05 Hours
	Assemble Instruction Format, Assembler: Introduction to Assembler and Assembler Directives, Data Transfer Instructions, Arithmetic Instructions, Branch Instructions	
Unit-6	8086 Assembly Language Programming-II	05 Hours
	Loop Instructions, NOP and HLT Instructions, Flag manipulation instructions, Logical, Shift and Rotate Instructions, Byte and String Manipulations: String Instructions and REP Instructions.	

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	1	2	-	2	-	2	3	2	2	2
CO2	3	2	3	1	1	-	-	2	-	2	-	1
CO3	-	2	1	2	2	-	-	2	-	2	-	2
CO4	2	2	-	-	-	-	-	1	2	2	1	2
CO5	3	2	1	-	1	-	-	-	2	1	2	1



References	
Text Books :	
1	Digital System, Principles and Applications, Ronal Tocci, Neal Widmer, Gregory Moss, Pearson Education, 10 th Edition (2009)
2	Microcomputer Systems, The 8086/8088 Family Architecture, Programming and Design, Yu-Cheng Liu Glenn A Gibson, PHI, 2 nd Edition (1998)
Reference Books :	
1	Digital Logic and Computer Design, M. Morris Mano, Pearson Education, 1 st (2004)
2	The Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium Pro Processor, Pentium –II, Barry B. Brey, Pearson Education, 8th Edition, (2009)
SWAYAM Courses (Operational Timestamp: Thu, 25-Jul-2024 on 7:00 AM)	
1	NPTEL Course on Digital Circuits Prof.Shantanu Murthy IIT, Kharagpur https://onlinecourses.nptel.ac.in/noc24_ee147/preview
Virtual Lab	
1	Digital Application Lab (New) https://daiitb.vlabs.ac.in/Introduction.html&sa=D&source=editors&ust=1720505407003556&usg=AOvVaw02o9LVE79TfDtg3dkM18bk



23UG-PCC-CSE303- Data Structures

[Click for Syllabus Structure](#)

Teaching Scheme
Lectures : 3 Hrs/Week
Credits : 2

Evaluation Scheme
ISE : 40 Marks
ESE : 60 Marks

Course Objective :		
1	To Make the students familiar with basic data structures.	
2	To Provide students with foundation in computer programming and problem solving.	
3	To Enable the students to select appropriate data structures in computer applications.	
4	To Provide the detail of implementation of various data structures	
Course Outcomes :		
COs	At the end of successful completion of the course, the students will be able to	Bloom's Taxonomy
CO1	Explain the definitions and basic concepts of data structures.	Remember
CO2	Identify the appropriate sorting and searching algorithms for a given problem size/datasets.	Understand
CO3	Discuss the use of tree and graph data structure.	Understand
CO4	Implement Stack, Queue and linked list.	Apply
CO5	Choose appropriate data structure for solving real time problems.	Apply

Course Description :		
The course is designed to develop skills to design and analyze simple linear and non-linear data structures. It strengthens the ability of the students to identify and apply the suitable data structure for the given real world problem.		
Prerequisites :	1	Computer Programming in C [23FY111]
Section – I		
Unit-1	Basic of Data Structures	04 Hours
	Definition, Primitive and Non-Primitive data structures, Operations on data structure Recursive and non recursive algorithm, Introduction to pointers, Dynamic Memory Allocation	
Unit-2	Searching and Sorting Techniques	09 Hours
	Searching Techniques: Linear search, Binary search, complexity comparisons and Analysis. Sorting Techniques: Bubble sort, Selection sort, Insertion sort, Merge sort, Quick sort, Radix sort.	
Unit-3	Linear Data Structures	07 Hours
	Stack: Definition, operations, Array representation of stack, Applications of Stack Queue: Definition, operations, Array representation of queues, Types of Queue -Circular queue, Priority queue, Double Ended Queue, Applications of Queue.	



Section – II		
Unit-4	Linked Lists	07 Hours
	Definition, Types of Linked Lists, Operations, implementation and applications of singly, doubly and circular linked lists. Linked representation of stack and Queue.	
Unit-5	Trees	06 Hours
	Definition, Tree Terminology, Static And Dynamic Representation, Binary tree, Types of Binary Tree, Binary Tree traversals, Binary search tree, AVL search tree, Heaps- Operations and their applications, Heap Sort.	
Unit-6	Graphs	06 Hours
	Basic concept of graph theory, Terminology and Applications, Types of Graphs, Representation of graphs using Adjacency matrix and Adjacency list, graph traversal techniques- BFS and DFS, Graph representation using sparse matrix.	

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	1	1	1	1	1	-	-	1	2
CO2	3	2	2	1	1	1	1	1	-	-	1	2
CO3	3	2	1	1	1	1	1	1	-	-	1	2
CO4	3	2	1	1	1	1	1	1	-	1	1	2
CO5	3	3	2	2	1	1	1	1	-	-	1	2

References	
Text Books :	
1	Schaum's Outlines Data Structures, Seymour Lipschutz, McGraw Hill
Reference Books :	
1	Data Structure using C, A. M. Tanenbaum, Y. Langsam, M. J. Augenstein, PHI
2	Data Structures- A Pseudo code Approach with C, Richard F. Gilberg and Behrouz Forouzon, 2 nd Edition
3	Data Structures through C, Yashvant P Kanetkar, BPB
4	Understanding and Using C, Richard Reese, O'Reilly Media; 1st edition
SWAYAM Courses (Operational Timestamp: Thu, 25-Jul-2024 on 7:00 AM)	



1	NPTEL Course on Data Structure and Algorithm using JAVA Prof.Debasis , Samanta IIT, Kharagpur. https://nptel.ac.in/courses/106105225
2	Data Structures And Algorithms Prof.Naveen Garg IIT Delhi https://nptel.ac.in/courses/106102064
Virtual Lab	
1	Virtual Lab on Data Structure-1 Virtual Lab on Data Structure-1 https://iitb.vlabs.co.in/outreachportal/ncocdc/list_of_labs.html



23UG-PCC-CSE304-Software Engineering

[Click for Syllabus Structure](#)

Teaching Scheme
Lectures : 2 Hrs/Week
Credits : 2

Evaluation Scheme
ISE : 40 Marks
ESE : 60 Marks

Course Objective :		
1	To understand software process models and importance of Software Development Life Cycle (SDLC)	
2	To learn of software requirements gathering and analysis process and prepare SRS (Software Requirement Specification) document.	
3	To understand the different software design and architectural styles.	
4	To learn different software testing approaches and software quality management	
Course Outcomes :		
COs	At the end of successful completion of the course, the students will be able to	Bloom's Taxonomy
CO1	Describe various software engineering concepts, Software Development Process Models (SDPMs)	Remember
CO2	Interpret the structure and essential sections of Software Requirement Specifications (SRS) documents	Understand
CO3	Describe different architectural views and identify software architecture for a given problem	Understand
CO4	Design and demonstrate Software system or applications using SRS document.	Apply
CO5	Identify different software testing techniques and understand standards related to software reliability and quality management.	Understand

Course Description :		
This course provides fundamentals of Software Development Life Cycle (SDLC), principles of software engineering practices and introductory concepts of software project management		
Prerequisites :	1	--
Section – I		
Unit-1	Introduction to Software Engineering	05 Hours
	Cost, Schedule & Quality, Scale and Change, Software Processes: Process & Project, Software Development Process Models: Waterfall model, Prototyping, Iterative Development, Rational Unified Process, Time boxing Model, Extreme programming and agile software development, Using process models in a project, Project Management Process	
Unit-2	Software Requirement Engineering	04



	<p>Requirement Gathering and Analysis, Software Requirement Specification (SRS)</p> <p>Case Study 2.1</p> <ul style="list-style-type: none"> Gather the requirements for automation of the office work at CSE department <p>Case Study 2.2</p> <ul style="list-style-type: none"> Study the SRS of Library Management Software. Write SRS in IEEE format for given Project Statement <p>Case Study 2.3</p> <p>Study the functional and non-functional requirements of Library Management Software (or any software) Identify the important functional and non-functional requirement for given Project Statement</p>	Hours
Unit-3	Software Architecture	05 Hours
	<p>Role of Software Architecture, Architecture View, Component and Connector View, Architecture styles for Component and Connector View, Evaluating Architectures. Project Planning: Sliding Window Planning, Software Project Management Plan (SPMP) Document, COCOMO Model. Project Scheduling: WBS, Activity Networks, PERT, Gantt Charts.</p> <p>Case Study 3.1</p> <p>Prepare SPMP document for allocated problem.</p>	
Section – II		
Unit-4	Software Design	05 Hours
	<p>Design Concepts, Function Oriented Design: Structure Charts, Structured Design Methodology, An Example. Object Oriented Design: OO Concepts, Unified Modeling Language (UML), A Design Methodology, Examples. Detailed Design, Verification, Metrics</p> <p>Case Study 4.1</p> <p>Study the design of Library Software / or any project statement</p>	
Unit-5	Coding and Testing	05 Hours
	<p>Coding, Code Review, Software Documentation, Testing, Unit Testing, Black-Box Testing, White-Box Testing, Program Analysis Tools, Integration Testing, System Testing</p> <p>Case Study 5.1</p> <p>Study of Automation Testing Tool: Selenium</p>	
Unit-6	Software Reliability and Quality Management	04 Hours
	<p>Software Reliability, Software Quality, ISO 9000, SEI Capability Maturity Model, Six Sigma</p>	



Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	1	1	-	1	1	2	1	-	1
CO2	2	2	3	1	1	-	-	1	-	1	-	1
CO3	1	1	2	-	1	-	-	-	-	1	-	-
CO4	1	1	2	2	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	2	-	-	1

References	
Text Books :	
1	Software Engineering: A Precise Approach, Pankaj Jalote, PHI, 2 nd Edition 1988
2	Fundamentals of Software Engineering, Rajib Mall, PHI, 3 rd Edition, 2009
Reference Books :	
1	Software Engineering, Ian Sommerville, Pearson, 9 th Edition, 2017
2	Software Engineering : A Practitioner's Approach, Roger Pressman, McGraw-Hill, 6 th Edition, 2004
3	The Unified Modeling Language User Guide Grady Booch Ivar Jacobson James Rumbaugh Addison-Wesley 2 nd Edition, 2005
SWAYAM Courses (Operational Timestamp: Thu, 25-Jul-2024 on 7:00 AM)	
1	NPTEL Course on Software Engineering Prof. Rajib Mall IIT Kharagpur https://onlinecourses.nptel.ac.in/noc19_cs69/preview



23UG-PCC-CSE305-Discrete Mathematical Structure

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Teaching Scheme	
Lectures	: 2 Hrs/Week
Credits	: 3
Tutorials	: 1 Hr/Week

Evaluation Scheme	
ISE	: 40 Marks
ESE	: 60 Marks
ISA	: 25 Marks

Course Objective :		
1	To expose the students to the mathematical logic related to computer science areas	
2	To enhance the problem solving skills in the areas of theoretical computer science.	
3	To use mathematical concepts in the development of computer applications.	
Course Outcomes :		
COs	At the end of successful completion of the course, the students will be able to	Bloom's Taxonomy
CO1	Illustrate the concepts of propositional logic ,predicate Calculus and Set theory	Understand
CO2	Operations on Sets, relations , functions and Lattice	Apply
CO3	Classify the algebraic system with their Properties	Understand
CO4	Use Boolean algebra to represent Boolean Logic and perform operations.	Apply
CO5	Demonstrate and utilize Graphs theory to solve graph related problems	Apply

Course Description :		
This course provides detailed insights on Discrete Mathematics used in Computer Science		
Prerequisites :	1	Concepts of Basic Mathematics
Section – I		
Unit-1	Mathematical Logic	08 Hours
	Statements & Notations, Connectives, Well-formed formulas & Tautologies, Equivalence of formulas & Duality law, Tautological Implications, Other Connectives, Predicate Calculus	
Unit-2	Set Theory	04 Hours
	Basic concepts of set theory, Operations on Sets, Venn Diagrams, Ordered pairs & n-tuples, Cartesian product	
Unit-3	Relations & Functions	08 Hours
	Relations, Properties of binary relations, Representation of relation , Equivalence Relations, Composition of Binary Relation, POSET & Hasse Diagram, Functions, Types of Functions	
Section – II		
Unit-4	Algebraic Systems	05



	Algebraic Systems: Examples & general properties., Semigroups & Monoids, Groups: Definitions & Examples, Subgroup & Homomorphism	Hours
Unit-5	Lattice and Boolean Algebra	07 Hours
	Lattice as partially ordered sets, Lattice as Algebraic Systems, Special Lattices, Boolean Algebra: Definitions & examples, Boolean Functions, Representation & Minimization of Boolean Functions	
Unit-6	Graph Theory	07 Hours
	Basic concepts of graph theory, Paths, Reachability & Connectedness, Matrix Representations of Graphs, Storage Representation & Manipulations of Graphs, PERT & Related technologies	

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	--	--	--	--	1	--	--	--	--	--	2
CO2	2	--	--	1	--	--	--	--	1	--	--	2
CO3	3	1	1	1	--	1	--	--	--	--	--	1
CO4	3	2	2	2	1	1	--	--	--	--	1	2
CO5	3	2	2	2	--	1	--	1	--	--	1	1

References	
Text Books :	
1	Discrete Mathematical Structures with Application to Computer Science, J. P. Tremblay & R. Manohar (MGH International).
Reference Books :	
1	Elements of Discrete Mathematics, C.L.Liu & D.P.Mohapatra (SIE Edition) TATA-McGraw Hill.
2	Discrete Mathematics and its Applications - Kenneth H. Rosen (AT&T Bell Labs)
3	Discrete Mathematics - Semyour Lipschutz, MarcLipson (MGH), Schaum's outlines
4	Discrete Mathematical Structures – Bernard Kolman, Robert Busby, S.C.Ross and Nadeemur-Rehman (Pearson Education)
SWAYAM Courses (Operational Timestamp: Thu, 25-Jul-2024 on 7:00 AM)	
1	NPTEL Course on Discrete Mathematics - IIT Ropar Prof. Sudarshan Iyengar, Prof. Anil Shukla https://onlinecourses.nptel.ac.in/noc24_cs92



23UG-MDM1-CSE306- Statistical Computing

[Click for Syllabus Structure](#)

Teaching Scheme
Lectures : 2 Hrs/Week
Credits : 2

Evaluation Scheme
ISA : 50 Marks

Course Objective :		
1	To equip students with the foundational skills to perform basic arithmetic operations, create and manipulate vectors, and work with arrays using R.	
2	Learn to define matrices, including operations like transposition, identity, and arithmetic operations, along with techniques for subsetting and extracting elements.	
3	Grasp the concepts of logical values and operators in R, and perform basic string operations for data manipulation	
4	Develop skills to create, manage, and access lists and data frames, and logical record subsetting	
5	Gain proficiency in using R for basic plotting, handling graphical parameters, and working with various types of data files.	
Course Outcomes :		
COs	At the end of successful completion of the course, the students will be able to	Bloom's Taxonomy
CO1	Calculate measures of central tendency, dispersion, and variability such as mean, median, mode, range, quartile deviation, and standard deviation.	Remember
CO2	Execute various matrix operations such as transpose, identity, scalar multiplication, and other arithmetic operations.	Apply
CO3	Apply logical operators and relational operators, handle true/false values, and perform basic string operations within data manipulation tasks.	Choose
CO4	Manipulate lists and data frames, including accessing components, naming and nesting lists, adding columns to data frames, and combining multiple data frames efficiently.	Apply
CO5	Demonstrate the ability to create plots using coordinate vectors, customize graphical parameters, and manage data files.	Understand

Course Description :		
The course provides an introduction to statistical computing, focusing on practical data analysis using statistical software. Topics include descriptive statistics, probability distributions, hypothesis testing, regression analysis, and data visualization. Students will gain hands-on experience in applying statistical methods to real-world data, preparing them for advanced studies and professional work in data science and analytics.		
Prerequisites :	1	Engineering Mathematics-I [23FY102]



	2	Engineering Mathematics-II [23FY201]
	3	Computer Programming in C Lab [23FY111]
Section – I		
Unit-1	Numeric, Arithmetic and Vectors, Arrays	
	R for basic Math: Arithmetic Operations. Vectors: Creating a vector, Sequence, Repetition, sorting & Lengths. Sub setting and Element Extraction, Arrays: Definition, Extraction	
Unit-2	Matrices and Non Numeric Values	
	Defining a matrix: Filling Direction, Row & Column bindings, Matrix Dimensions. Sub setting: Row, Column & Diagonal Extractions, Omitting & Overwriting, Matrix Operations: Transpose, Identity, Scalar, Arithmetic Operations on Matrix. Logical Values: True or False, Relational Operators, Logical operators, String Operations	
Unit-3	Lists and data frames	
	Lists of Objects: Definition and Component Access, Naming and Nesting Data Frames: Construction, Adding data Columns and Combining Data Frames, Logical Record Subset	
Section – II		
Unit-4	Basic Plotting and File handling	
	Using Plot with Coordinate Vectors, Graphical Parameters: Automatics Plot Types, Title and Axis Labels, Color, Line & point Appearances and Plotting Region Limits, R-Ready data sets: built-in data sets, Contributed data sets Reading in External Data Files: Table Format, Spreadsheet Workbooks, Web-Based Files, Other file Formats, Writing out data Files & Plots: data sets, Plots & Graphic files	
Unit-5	Loops and Functions	
	Scoping, Argument Matching, If statements, Loops Function Command, Arguments, Specialized Functions	
Unit-6	Elementary Statics	
	Describing Raw Data, Summary Statics (Centrally: Mean, Median & Mode. Counts, Percentages, & Proportions), Quantiles, Percentiles, & Five number Summary Spread: Variance, Standard Deviation, Covariance and Correlations Outliers	

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	--	2	2	--	--	--	--	--	--	--
CO2	3	3	--	--	1	--	--	--	--	--	--	--



CO3	3	2	--	--	2	--	--	--	--	--	--	--
CO4	3	--	--	--	3	--	--	--	--	--	--	--
CO5	2	--	--	--	3	--	--	--	2	--	--	--
References												
Text Books :												
1	The Book of R, Tilman M. Davies, No Starch Press, San Francisco, 1 st Edition (2016)											
2	Statistics With R Programming, Rakshu, JNTU, McGraw-Hill Education (2018)											
Reference Books :												
1	Schaum's Outline of Statistics, McGraw-Hill Education, 6 th Edition, 2018											
SWAYAM Courses (Operational Timestamp: Thu, 25-Jul-2024 on 7:00 AM)												
1	NPTEL Course on Introduction to R Software Prof. Shalabh IIT Kanpur https://onlinecourses.nptel.ac.in/noc19_ma33/											



23UG-EEC1-CSE307-1- Entrepreneurship Management

[Click for Syllabus Structure](#)

Teaching Scheme
Lectures : 2 Hrs/Week
Credits : 2

Evaluation Scheme
ISA : 25 Marks

Course Objective :		
1	Understand the characteristics, qualities, and functions of an entrepreneur.	
2	Analyze the role of Small Scale Industries (SSIs) in economic development.	
3	Identify and evaluate various sources of institutional support for SSIs.	
4	Develop a comprehensive project report, including feasibility studies and planning.	
Course Outcomes :		
COs	At the end of successful completion of the course, the students will be able to	Bloom's Taxonomy
CO1	Recall the characteristics, qualities, and functions of an entrepreneur.	Remember
CO2	Understand the role of Small Scale Industries (SSIs) and their impact on economic development.	Understand
CO3	Identify and compare various sources of institutional support available for SSIs.	Analyze
CO4	Develop comprehensive project reports including feasibility studies and detailed planning.	Apply
CO5	Examine and compare different forms of industrial ownership, identifying their advantages and disadvantages.	Analyze

Course Description :			
<p>This course introduces students to Entrepreneurship Management, focusing on starting and managing small businesses. Topics include characteristics of successful entrepreneurs, the role of small-scale industries in economic development, institutional support, business planning, feasibility studies, and forms of industrial ownership. Practical and theoretical insights prepare students for entrepreneurial challenges and opportunities.</p>			
Prerequisites :	1	Communication Skills [23FY106]	
	2	Employability Enhancement Skills [23FY115]	
	3	Inquisitive Learning [23FY115T]	
Section – I			
Unit-1	Entrepreneurship		05 Hours
	Characteristics of Entrepreneur, Qualities of an Entrepreneur, Functions of an Entrepreneur, Types of Entrepreneur Development of Entrepreneurship, Stages in Entrepreneurial Process, Role of Entrepreneur in Economic development, Entrepreneurship in India, Barriers of Entrepreneurship, Women Entrepreneurs		



Unit-2	Small Scale Industry	05 Hours
	Objectives of SSIs, Scope of SSIS, Role of SSI in Economic Development, Advantages of SSIs, Steps to Start a SSI, Government Policy towards SSI, World Trade Organisation (WTO), All India Institutions, State Level Institutions, Fund-Based Institutions, Ancillary Industry and Tiny Industry, Ancillary Industry	
Unit-3	Institutional Support	05 Hours
	Institutions to assist SSI, State Small Industries Development Corporation (SSIDC), Small Scale Industries Board (SSIB), District Industries Centres (DICs) / Single Window Concept, Technical Consultancy Organisations (TCOs), Small Industries Service Institutes (SISIs), Industrial Credit and Investment Corporation of India Ltd. (ICICI), National Small Industries Corporation (NSIC), Small Industries Development Organisation (SIDO), Industrial Development Bank of India (IDBI)	
Section – II		
Unit-4	Preparation of Project	05 Hours
	Project Identification, Project Selection, Project report-Need and Significance, Contents of Project Report, Project Formulation, Specimen of a Project Report	
Unit-5	Business Opportunities	05 Hours
	Identification of Business Opportunities, Sources of Business Ideas, Market Feasibility Study, Technical Feasibility Study, Financial Feasibility Study, Social Feasibility Study	
Unit-6	Industrial Ownership	05 Hours
	Sole proprietorship, Advantages of Sole Proprietorship, Disadvantages of Sole Proprietorship, Definition and Meaning of Partnership, Characteristics of Partnership, Kinds of Partners, Partnership Agreement or Partnership Deed, Registration of Partnership Firm, Rights, Duties and Liabilities of Partners.	

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	--	--	--	--	--	--	--	--	--	3	3
CO2	--	2	2	--	--	--	--	--	--	3	3	3
CO3	--	--	2	2	--	--	--	--	--	2	3	3
CO4	--	--	--	--	3	3	3	3	--	--	--	--



CO5	--	--	--	--	--	--	--	--	3	--	--	3
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References	
Text Books :	
1	Management and Entrepreneurship N.V.R. Naidu, T Krishna Rao
Reference Books :	
1	Entrepreneurship Development and Small Business Enterprises - Poornima M. Charantimath, Pearson
2	Small Scale Industries in India: Problems and Prospects - B.S. Bodla, Sultan Chand & Sons
3	Indian Economy: Performance and Policies - Uma Kapila, Academic Foundation
SWAYAM Courses (Operational Timestamp: Thu, 25-Jul-2024 on 7:00 AM)	
1	Entrepreneurship By Prof. C Bhaktavatsala Rao IIT Madras https://onlinecourses.nptel.ac.in/noc24_mg93/preview
2	Understanding Incubation and Entrepreneurship Dr. B.K. Chakravarthy IIT Bombay https://nptel.ac.in/courses/107101092



23UG-VEC1- CSE308-1- Object Oriented Programming using C++

[Click for Syllabus Structure](#)

Teaching Scheme
Lectures : 2 Hrs/Week
Credits : 1
Practical : 2 Hrs/Week

Evaluation Scheme
ISA : 25 Marks
ESE(POE) : 50 Marks

Course Objective :		
1	To learn advanced features of the C++ programming language as a continuation of the previous course.	
2	To learn the characteristics of an object-oriented programming language: data abstraction, inheritance, and dynamic binding of the messages to the methods..	
3	To learn the basic principles of object-oriented design and software engineering in terms of software reuse and managing complexity	
4	To enhance problem solving and programming skills in C++ with extensive programming projects	
5	To become familiar with the UNIX software development environment.	
Course Outcomes :		
COs	At the end of successful completion of the course, the students will be able to	Bloom's Taxonomy
CO1	Understand basic concepts of Object Oriented Programming.	Understand
CO2	Write well-structured C++ programs, including the use of classes, objects, constructors, destructors, and member functions to solve computational problems.	Understand
CO3	Implement the features of an object-oriented programming language	Apply
CO4	Implement the concept of template, exception handling and file handling using C++	Apply
CO5	Implement the solution for diverse problem using C++	Apply

Course Description :		
The course introduces students to the fundamental concepts and principles of object-oriented programming (OOP) It helps students to choose proper OOP concepts to solve different problems. Upon completion, students should be able to write efficient, reusable programs for a given problem using OOP concepts		
Prerequisites :	1	Computer Programming in C [23FY111]
Section – I		
Unit-1	Basics of Object Oriented Programming	
	The Origins and history of C++, relations of Classes & Structures, Features of Object Oriented Programming : Classes & Objects, Encapsulation, Data Abstraction, Inheritance, Inline Function, Constructor & Destructor ,function overloading & Operator overloading, classes, Friend functions, Friend class	
		04 Hours



Unit-2	Functions in C++	05 Hours
	Static class member, Static Member Function, Scope resolution Operator, Access members Data member & member Function, Defining member functions, Passing Object to Functions, Pointers in C++, Dynamic Allocation Pointers :-New & Delete Operator	
Unit-3	Polymorphism in C++	04 Hours
	Functions Overloading, Operator Overloading, Types of Constructors, Destructors, Operator Overloading Using Friend Function, Unary & Binary Operator Overloading	
Section – II		
Unit-4	Inheritance & Virtual Function	06 Hours
	Inheritance, Single Inheritance, Types of Derivations, Multiple Inheritance, Multilevel Inheritance, Hybrid Inheritance ,Hierarchical Inheritance , Virtual function, Calling a Virtual function through a base class reference, Virtual functions are hierarchical, Pure virtual functions, Abstract classes, Early and late binding	
Unit-5	Templates & Exception handling	05 Hours
	Function Template ,Class Template, Generic Classes ,Generic Functions, Applying Generic Functions Type Name, Standard Template Library (STL):- STL Container, STL Algorithm, STL iterator. Exception handling:- Exception handling fundamentals, Catching, Throwing, & Handling Exception, Exception handling options.	
Unit-6	I/O System Basics, File I/O	04 Hours
	Streams, File Pointers & Redirections Streams, C++ stream, C++ Predefined stream classes, Formatted I/O, C++ file I/O, manipulators, fstream and the File classes, File operations, namespaces, std namespace.	

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	1	1	1	1	--	1	--	--	1	2
CO2	3	1	1	1	1	1	--	1	--	--	1	2
CO3	3	1	1	1	1	1	--	1	--	--	1	2
CO4	2	1	2	1	1	1	--	1	--	--	1	2
CO5	2	2	2	1	1	1	--	1	--	--	2	2



References	
Text Books :	
1	Object oriented Programming in C++, Rajesh K. Shukla (Wiley), India Edition Manohar (MGH)
2	The Complete Reference C++, Herbert Schildt, Tata McGraw Hill, 4th Edition
Reference Books :	
1	Object-Oriented Programming with C++, E. Balaguruswamy, Tata McGraw Hill, 6th Edition
2	Object oriented Programming With C++, Sourav Sahay, Oxford Press, 2 nd Edition
SWAYAM Courses (Operational Timestamp: Thu, 25-Jul-2024 on 7:00 AM)	
1	NPTEL Course on Programming in Modern C++ Prof.Partha Pratim Das IIT, Kharagpur. https://nptel.ac.in/courses/106105234

List of Experiments

Expt. No.	Experiment Name
1	Implementation of simple class and object concept.
	Create a class called 'employee' that has (1) Emp_code and Emp_name as data members. (2) Member function get_data() to input data. (3) Member function display to output data. (4) Create array of objects to accept and display the details of at least 5 employees
2	Implementation of different types of constructors and destructors.
	Write a program to calculate fix deposit for specific no of Years and particular rate by using constructor and destroy the object by using destructor
3	Implementation of inline function
	Write a program to find out largest of three numbers by using inline function.
4	Implementation of 'this' pointer
	Write a program to display the value and address of an object using 'this' pointer
5	Implementation of function overloading
	Write a program to compute power (m,n) where • 'm' is double and 'n' is integers • 'm' and 'n' are integers
6	Implementation of operator overloading
	Create a matrix class of size m*n overload the '+' Operator to add two matrix objects
7	Implementation of friend function
	Create a class 'Complex' to hold a complex Number, write a friend function to add two complex numbers
8	Implementation of friend class



	Create a friend class 'Customer' containing member functions withdraw, deposit and balance enquiry which access data members from class 'Account'
9	Implementation of Multilevel inheritance concept.
	Write a program to implement multilevel inheritance to calculate student result. By creating a Class student-name, roll-no, Test-marks, result-average
10	Implementation of Hybrid inheritance concept
	The 'MASTER' class derives information from 'ACCOUNT' and 'ADMIN' classes which in turn derives information from 'PERSON' class. Define four classes and write a Program to create, update and display all information. Person(name, code) Account(pay) Admin(Experience)
11	Implementation of virtual function.
	Write a program to implement virtual function for Bubble sort and selection sort.
12	Implementation of function template.
	Define function template for displaying transpose of Integer and float matrices
13	Implementation of class template
	Create a class template to hold two data members, write a program to add two integer and double numbers.
14	Implement of exception handling.
	Write a program to implement exception handling for Exception divide by zero.
15	Implementation of file handling.
	Using class and object write employee information to file named "EMPLOYEE" and by reading from the same file display the contents on the screen



23UG-CEP- CSE309- Field Project

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Teaching Scheme
Lecture : 1 Hr/Week
Practical : 2 Hrs/week
Credits : 2

Evaluation Scheme
ISA : 25 Marks

Course Objective :		
1	To introduce the students to the use of engineering approaches to solve real-time problems.	
2	To adhere to the software engineering approach methods and tasks.	
3	To acquire project management abilities, which involve planning, execution, and evaluation.	
4	To develop the abilities of team building and collaboration.	
Course Outcomes :		
COs	At the end of successful completion of the course, the students will be able to	Bloom's Taxonomy
CO1	Do a survey for the field project	Understand
CO2	Perform the requirements analysis and specifications.	Apply
CO3	Enhance teamwork and communication skills by working together.	Apply
CO4	Implementing the concepts of the field project.	Apply
CO5	Prepare a report and present the field project.	Apply

Course Description :		
The Field Project is designed to provide students with practical and field experience by engaging them in a project that addresses the general aspects of real time problems.		
Prerequisites :	1	Communication Skills Lab [23FY106]
	2	Software Engineering [23UG-PCC-CSE304]
Activity	Course Contents	Bloom's Taxonomy
Activity – 1	Identifying the area of Field Project	Understand
	Students must choose the area to solve different kinds of problems	
Activity – 2	Problem Identification	Understand
	Students must identify the problem to solve from chosen area.	
Activity – 3	Visit to Field	Apply
	Students must visit the chosen area.	
Activity – 4	First Presentation	Apply



	Student must present the identified problem statement (Synopsis)	
Activity – 5	Requirement Elicitation	Apply
	Students must elicit the requirement for identified problem.	
Activity – 6	Requirement Analysis	Analysis
	Students must analyse the requirement for identified problem	
Activity – 7	Preparation of SRS Document as per Industry Standard	Apply
	Students must prepare the document as per IEEE /Industry Standard	
Activity – 8	Second Presentation	Apply
	Student must present on SRS of Field Project	
Activity - 9	Finalization of modules for field project	Apply
	Students must finalize the number of modules for field project.	
Activity – 10	Design the modules for field project. (Flowchart and Algorithms)	Apply
	Students must design modules.	
Activity – 11	Implementation of modules	Apply
	Students must implement the modules	
Activity – 12	Report Preparation and Final Presentation	Understand
	Student Must Present their field work in front of panel of examiner	

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	2	1	1	2	1	1	3	2	1	2
CO2	1	2	1	1	1	2	-	1	1	2	1	2
CO3	1	-	1	1	-	1	1	1	2	3	1	2
CO4	1	2	3	2	1	1	-	1	1	2	1	2
CO5	1	1	1	1	2	1	1	1	2	2	2	2



23UG-PCC-CSE301P –Data Structure Lab

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Teaching Scheme
Lectures : 4 Hrs/Week
Credits : 2

Evaluation Scheme
ISA : 25 Marks
ESE(POE) : 25 Marks

Expt. No.	Experiments
1	Implementation of Searching Techniques Students Should Write the C Programs for: (a) <i>Linear Search algorithm</i> (b) <i>Binary Search algorithm</i>
2	Implementation of Sorting Techniques (Part-I) (a) <i>Program for Bubble Sort and find number of iterations</i> (b) <i>Program for Insertion Sort and find number of iterations</i>
3	Implementation of Sorting Techniques (Part-II) <i>Program for Selection Sort and find number of iterations.</i>
4	Implementation of Stack operations Program for Implementation of Stack operations (a) <i>Push</i> (b) <i>Pop</i> (c) <i>Display</i> (d) <i>Peek</i>
5	Implementation of Linear Queue operations Program for Implementation of Linear Queue and Circular Queue with operations (a) <i>enqueue</i> (b) <i>dequeue</i> (c) <i>display</i>
6	Implementation of Singly Linked List operations (insertion and deletion from start) Program for Implementation of Singly Liked List with the listed operations (a) <i>insert at start</i> (b) <i>delete at start</i>
7	Implementation of Singly Linked List operations (insertion and deletion from end) (a) <i>insert at end</i> (b) <i>delete at end</i>
8	Implementation of Singly Linked List operations (insertion and deletion from given location) (a) <i>insert at given location</i> (b) <i>delete at given location</i> (c) <i>search for given data item</i> (d) <i>display</i>



9	Implementation of Doubly Liked List operations (insertion and deletion from start)
	Program for Implementation of Doubly Liked List with the listed operations (a) <i>insert at start</i> (b) <i>delete at start</i>
10	Implementation of Doubly Liked List operations (insertion and deletion from end)
	Program for Implementation of Doubly Liked List with the listed operations (a) <i>insert at end</i> (b) <i>delete at end</i>
11	Implementation of Doubly Liked List operations (insertion and deletion from given location)
	(a) <i>insert at given location</i> (b) <i>delete at given location</i>
12	Implementation of Doubly Liked List operations (Searching & displaying given data items)
	(a) <i>search for given data item.</i> (b) <i>display the contents of list from start to end</i> (c) <i>display the contents of list from end to start</i>
13	Implementation of merging of two linked lists
	<i>Write a Program for merging two linked lists</i>
14	Implementation of Binary Tree Traversals Techniques
	Program for Implementation of Binary Tree to perform recursive traversal methods (a) <i>preorder</i> (b) <i>postorder</i> (c) <i>inorder</i>
15	Implementation of creation of Binary Search Tree Traversal
	<i>Program to creation of binary search tree and its inorder traversal</i>
16	Implementation of techniques for Graph representations
	(a) <i>Program to implement Adjacency Matrix Representation of Graph.</i> (b) <i>implement the DFS and BFS traversal mechanism.</i>



23UG-PCC-CSE302P – Digital System & Microprocessor Lab

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Teaching Scheme

Lectures : 2 Hrs/Week

Credits : 1

Evaluation Scheme

ISA(TW) : 25 Marks

ESE(OE) : 25 Marks

Expt. No.	Experiments
1	Study of Number Conversions
2	Study of Basic Logic Gates
3	Realization of Basic Logic Gates using Universal Gates
4	Design of Half adder and full adder using logic gates
5	Study of K-Map with examples
6	Design of 7-segment display.
7	Study of JK flip flop, SR flip flop, D-flip flop, T-flip flop
8	Write an 8086 Assembly Language Program (ALP) to perform Addition, Subtraction, Multiplication and Division
9	Write an ALP to find even and odd number from given data.
10	Write an ALP to perform Block Transfer.
11	Write an ALP to perform logical operations.
12	Write an ALP to perform String manipulation instruction.



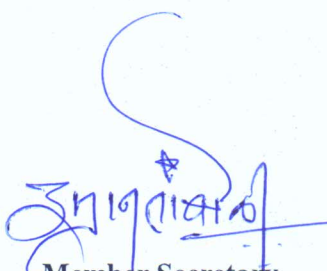
23UG-PCC-CSE305T -Discrete Mathematical Structures

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Teaching Scheme
Tutorial : 1 Hr/Week
Credits : 1

Evaluation Scheme
ISA : 25 Marks

Tutorial. No.	Tutorial
1	Statement formulas & Well-formed formula
2	Equivalence of formulas & Tautological Implications
3	Set theory concepts & Set Operations
4	Relation concepts & Properties of Relations
5	POSET & Functions
6	Algebraic Systems & it's Types
7	Lattices & examples
8	Boolean Algebra & Boolean Function
9	Graph Concepts & Matrix Representation
10	Storage Representation & Applications of graph


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