

Effective from Session: 2020	-21						
Course Code	CA451	Title of the Course	DISCRETE MATHEMATICS	L	Т	Р	С
Year	Ι	Semester	Ι	3	1	0	4
Pre-Requisite	NONE	Co-requisite	NONE				
Course Objectives	<ul> <li>Knov</li> <li>Able</li> <li>Learn</li> <li>Learn</li> </ul>	w the basic principle of s to Understand the conce in the logical notation and in the representation of la in the concepts of graphs	set theory, relations, function and its operations. epts of groups, and elementary properties of Rings and Field d determine if the argument is or is not valid in preposition a attices with POSET. , trees and its traversal, and recurrence relations.	s. nd pre	dicate l	ogic.	

	Course Outcomes
CO1	To understand the basic principle of set theory, relations, function and its operations.
CO2	Understand the algebraic structure related to the groups, and elementary properties of Rings and Fields.
CO3	Write an argument using logical notation and determine if the argument is or is not valid.
CO4	To understanding and representation of lattices and be able to determine their properties with Boolean algebra.
CO5	Demonstrate the problem using graphs and represent the trees traversal, and also basics of recurrence relations.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO								
1	Set Theory	Set Theory: Introduction, Basic concepts, Terminology and notation, Sub set, Operation on sets, Algebra of sets, Combination of sets, Multi-sets, Ordered pairs and Cartesian product. Relations: Definition, Relation on Sets, Operations on relations, Properties of relations, Composite relations, Equality of relations, Closure of relations. Functions: Definition, Classification of functions, Operations on functions, recursivelydefined functions. Mathematical Induction: Mathematical Induction.	8	CO1								
2	Algebraic Structures	Algebraic Structures: Monoid, Semigroup and Groups, Subgroups, Cyclic groups, Cosets, Normal subgroups, Permutation and Symmetric groups, Group homeomorphisms, Type of homeomorphisms, Rings, and Fields.	8	CO2								
3	Propositional Logic	Propositional Logic: Proposition, Truth tables, Converse, Contrapositive and Inverse, Tautology, Contradiction, Well Formed Formula (WFF), Algebra of proposition, Normal forms Disjunctive normal form and Conjunctive normal form. Predicate Logic: First order predicate, well-formed formula of predicate, quantifiers, Inference theory of predicate.	8	CO3								
4	Lattices	Lattices: Definition, Posets, Hasse diagram, Properties of lattices, Sub-lattices, Special lattices – Bounded, Complemented, Distributed, Modular and Complete lattice. Boolean algebra: Introduction, Theorems of Boolean algebra, Boolean expressions. Simplification of Boolean functions, Karnaugh maps, Logic gates, Digital circuits and Boolean algebra.	8	CO4								
5	Graphs	Graphs: Definition and terminology, Representation of graphs, Multi-graphs, Bipartite graphs, planar graphs, Isomorphism and Homeomorphism of graphs, Euler and Hamiltonian paths, Graph coloring. Trees: Definition, Binary tree, Binary tree traversal, Binary search tree. Recurrence Relation & Generating function: Recurrence Relation, Method of Characteristic Roots, Generating Function, and Solution of linear recurrence relations using generating functions.	8	CO5								
Referen	ce Books:											
1. S. F	K. Sarkar, "A Text Book	of Discrete Mathematics", S. Chand Publication, New Delhi, 2014.										
2. Kei	nneth H. Rosen, "Discre	te Mathematics and Its Applications", 6 th edition, McGraw-Hill, 2006.										
3. B. C	Colman, R.C. Busby, an	d S.C. Ross, Discrete Mathematical Structures, 5 th edition, Prentice Hall, 2004.										
4. J. P	. Tremblay, J.P and R. M	Annohar, "Discrete Mathematical Structure with Application to Computer Science", McGraw Hi	11.									
5. Dec	oNarsingh, "Graph Theo	ry With application to Engineering and Computer. Science", PHI. Private Limited, New Delhi, 2	012.									
6. Sey	5. Seymour Lipschutz, "Schaum's Outline of Discrete Mathematics", 3 rd edition, McGraw Hill, 2010.											
7. C.L	<ol> <li>C.L.Liu, "Elements of Discrete Mathematics", 2 nd edition, McGraw Hill Computer Science Series, 1985.</li> </ol>											
e-Learn	ing Source:											
1. http	os://onlinecourses.nptel.	ac.in/noc20_cs82/										
2. http	os://nptel.ac.in/courses/1	06108227										

						С	ourse A	Articul	ation N	Aatrix:	(Mappi	ng of COs	s with PO	s and PSC	Ds)			
PO- PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO1	3	1		1		2	1						2	1				
CO2	3	1		2	1	1	2		1				2	1				
CO3	1	2	3	2	2	1	2	1			1		1	2				
CO4	2	1		2		2	2	1			1		2	1				
CO5	1	3	3	2	2	2	1	2			1		1	2				



Effective from Session: 2020	-21						
Course Code	CA452	Title of the Course	COMPUTER ORGANIZATION AND ARCHITECTURE	L	Т	Р	С
Year	Ι	Semester	Ι	3	1	0	4
Pre-Requisite	NONE	Co-requisite	CA457				
Course Objectives	<ul> <li>To</li> <li>To</li> <li>Exp</li> <li>Lea</li> <li>Exc</li> </ul>	introduce students to the develop the ability to pe plain different types of a irn the concepts of paral emplify in a better way t	foundations of computer organization and architecture. rform programming in an assembly language. ddressing modes, Instruction Formats, CPU organization. an lel processing, pipelining and interprocessor communication he I/O, Pipelined Processors and SIMD Network	d men	iory org	anizatio	on.

	Course Outcomes
CO1	Perform basic operations with different number systems and Understand concepts of register transfer Language.
CO2	Understand the architecture and functionality of CPU and memory Organization
CO3	Understand the concept of I/O organization and Implement assembly language program for given task for 8085/8086 microprocessor
CO4	Understand the Concept of Parallel computing and its applications
CO5	Learn the concepts of pipelined processors and interprocessor communication

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Digital Logic Circuits	Digital Logic Circuits: Number System: Binary, Decimal, Octal & Hexadecimal, Logic Gates, K-Map Simplification, Combinational Logic & Sequential Logic circuits: Basic Processing: Register Transfer Language, Bus and Memory Transfers, Bus Architecture, Instruction code, Instruction set, Micro instruction.	8	CO1
2	Basic Organization	Basic Organization: Instruction Cycle, Organization of Central Processing Unit, Hardwired & Micro Programmed Control Unit, General Register Organization, Stack Organization, Addressing Modes, Instruction Formats Memory Organization: Memory Hierarchy, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory	8	CO2
3	I/O Organization	I/O Organization: Peripheral Devices, I/O Interface, Asynchronous Data Transfer, Strobe Control, Handshaking, Modes of Data Transfer: Programmed I/O, Interrupt Driven I/O, Priority Interrupt Programming: Assembly Language Programming Based on Intel 8085/8086, Instructions, Data Transfer Programming Techniques, Conditional Call and Return Instructions.	8	CO3
4	Parallel Computing	Parallel Computing: Introduction, Parallelism in Uniprocessor Systems, Parallel Computer Structures, Architectural Classification Schemes, Parallel Processing Applications. Pipelining Processing: An Overlapped Parallelism, Instruction and Arithmetic Pipelines.	8	CO4
5	Principles of Designing Pipelined Processors	Principles of Designing Pipelined Processors: Internal Forwarding and Register Tagging, Hazard Detection and Resolution, Job Sequencing and Collision Prevention, Characteristics of Vector Processing, SIMD Array Processors, Masking and Data Routing. SIMD Interconnection Network: Cube Interconnection Network, Shuffle-Exchange and Omega Network.	8	CO5
Referen	ce Books:			
1. Ma	no Morris, "Computer S	system Architecture", PHI, Third Edition, 2017		
2. Ka	i Hwang, FayéAlayé Bri	ggs," Computer Architecture and Parallel Processing", TMH, 2nd Edition 2017		
3. Wi	lliam Stallings; "Compu	ter Organization and Architecture", Pearson, Tenth Edition, 2016		
4. Ka	i Hwang,"Advanced Cor	mputer Architecture"TMH, Eighteenth Reprint 2008		
e-Learn	ing Source:			
1. htt	ps://nptel.ac.in/courses/	106106166		
2. htt	ps://nptel.ac.in/courses/	106105163		

						С	ourse A	Articul	ation N	Aatrix:	(Mappi	ng of COs	s with PO	s and PSC	Ds)			
PO- PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO1	3	1		3	1	1	2						2	1				
CO2	3	1		2		2	2	1					1	2				
CO3	2	2	3	1	3	1	1	2			1		1	1				
CO4	3	1		2	1	1	2						2	1				
CO5	1	2	1	1		2	2				1		1	2				



Effective from Session: 2020	-21						
Course Code	CA453	Title of the Course	FUNDAMENTALS OF COMPUTER AND C PROGRAMMING	L	Т	Р	С
Year	Ι	Semester	Ι	3	1	0	4
Pre-Requisite	NONE	Co-requisite	CA458				
Course Objectives	<ul> <li>To</li> <li>To</li> <li>To</li> <li>To</li> <li>Aft</li> </ul>	learn the basic concepts learn the basic concepts be able to develop logic learn the use of C librari learn the file handling a er learning the C program	of Computer fundamentals. and syntax of C programming. s which help them to create programs and applications using es functions in C language. nd basic memory allocation concepts in C language. mming, they can easily switch over to any other language.	C lang	guage.		

	Course Outcomes
CO1	Able to understand the basic knowledge of Computer fundamental and its application in computers.
CO2	Able to understand the basic concepts of C programming language.
CO3	Able to design and develop various programming problems using C programming concepts.
CO4	Able to Implement advance C programming concepts like function, pointer, structure and union etc.
CO5	Able to understand the file handling using C Programming language.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Introduction to Computers	Introduction to Computers: History, Generation, Classification, Characteristics. Input/ Output Devices: Keyboard, Mouse, Printer, Storage Units: Primary Memory and Secondary Memory. Basic Software Concepts: Definition, Classification: System Software, Application Software and Utilities. Introduction to DOS: Basics, Internal and External Commands. Basics of Networks: Network Types and Topologies. Introduction to Internet: Basic Terminologies: URL, Search Engine, Internet Service Provider (ISP), TCP/IP	8	CO1
2	Overview of C language	Overview of C language: History, Features of C language, Structure of C Programs, Compilation and Execution of C Programs, Type of Errors, Debugging Techniques. C Language Fundamentals: C Character Set, Identifiers and Keywords, Modifiers, Data Types and Sizes, Variables: Declaration and Initialization, Scope of Variables, Constants, Types of Constants, Typedef (), Type Conversion. Operators: Types of Operators (Unary and Binary Operators): Assignment, Arithmetic, Relational and Logical Operators, Increment and Decrement Operators, Conditional Operators, Size of() Operator, Comma Operator, Conditional Operator And Bitwise Operators. Expressions: Type of Expression, Precedence and order of Evaluation.	8	CO2
3	Decision Control Statements	Decision Control Statements: if, if-else, Nested if-else, switch, break, continue, goto statement. Loops: for, while, do-while. Arrays: Defining Array, Types of Arrays, Declaration and Initialization of Linear and Multidimensional Arrays. String: Character Array, Arrays and Strings, String Manipulation, String Functions.	8	CO3
4	Functions	Functions: Built-in And user-defined, Function Declaration, Definition And Function Call, Nesting of Functions, Parameter Passing, Recursive Functions, Multifile Programs. Pointers: Introduction, Pointer Operators (&,*), Pointer Arithmetic, Call by Value and Call by Reference, Dynamic Memory Allocation, calloc() and malloc() Functions.	8	CO4
5	Structure and Union	Structure and Union: Definition and Concept, Declaration and Initialization of Structure and Union Variables, Difference Between Structure And Union, Enumeration, Macros and C Preprocessors. File Handling in C: Definition of Files, Creating a Data File, Opening Modes of Files. Standard Function: fopen(), fclose(), feof(), fseek(), frewind(), Using Text Files: fgetc(), fputc(), fscanf() etc.	8	CO5
Referen	ce Books:			
1. V.	Rajaraman, "Fundament	als of Computers", PHI.		
2. Pat	er Norton's "Introduction	n to Computer", TMH.		
3. Ha	nn, "The Internet comple	ete reference", TMH.		
4. Pet	er Nortton's, "DOS Guid	le", Prentice Hall of India		
5. Go	ttfried, "Programming ir	1 C", Schaum's Series Tata McGraw Hill.		
6. Ke	rnigham, Ritchie, "The (	C Programming Language", PHI.		

e-Le	earning	g Sourc	e:															
1.	1. https://onlinecourses.nptel.ac.in/noc22_cs40/																	
2.	. https://onlinecourses.nptel.ac.in/noc19_cs42/																	
						С	ourse A	Articul	ation N	Aatrix:	(Mappi	ng of CO	s with PO	s and PSC	Ds)			
PO- PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7

PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO																		
CO1	3	1	2	2		1	2						2	1				
CO2	3	2	1	1	2	1	3	1					2	1				
CO3	1	2	3	2	3	1	2	1			1		1	2				
CO4	1	2	3	2	2	2	1	1			1		2	1				
CO5	3	1	1			2	2	1					2	1				



Effective from Session: 2020	-21						
Course Code	CA454	Title of the Course	UNIX AND SHELL PROGRAMMING	L	Т	Р	С
Year	Ι	Semester	Ι	3	1	0	4
Pre-Requisite	NONE	Co-requisite	CA459				
Course Objectives	<ul> <li>To</li> <li>To</li> <li>To</li> <li>To</li> <li>To</li> <li>To</li> </ul>	learn basic structure and learn and implement van learn basic concepts of p learn basics concepts an learn various Filter and	various commands of UNIX system. ious concepts of shell programming. process, Inter process communication in UNIX system. d commands of UNIX system Administration. Tools of UNIX system.				

	Course Outcomes
CO1	Able to understand the basic Unix architecture, commands and utilities of the UNIX operating system and to work confidently in Unix/Linux environment and open systems
CO2	Able to write simple and complex shell scripts to automate various tasks using shell programming
CO3	Understand various concepts of process, IPC and process related command in UNIX.
CO4	Able to understand UNIX system administration.
CO5	Master the students in the art of usage of simple advanced filters and tools.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Introduction	Introduction: Introduction to Unix, Unix System Organization (The Kernel and the Shell), Files and Directories, Library Functions and System Calls, Editors (vi and ed).	8	CO1
2	Unix Shell Programming	Unix Shell Programming: Types of Shells, Shell Meta characters, Shell Variables, Shell scripts, Shell Commands, Unix Environment, Integer Arithmetic and String Manipulation, Special Command Line Characters, Decision Making and Loop Control, Controlling Terminal Input, Trapping Signals, Arrays.	8	CO2
3	Portability with C	Portability with C: Command Line Argument, Background Processes, Process synchronization, Sharing of Data, User-ID, Group-ID, Pipes, Fifos, Message Queues, Semaphores Shared, Variables, Introduction to Socket Programming.	8	CO3
4	Unix System Administration	Unix System Administration: File System, Mounting and Un-mounting File System, System Booting, Shutting Down, Handling User Account, Backup, Recovery, Security, Creating Files, Storage of Files, Disk Related Commands.	8	CO4
5	Different Tools and Debugger	Different Tools and Debugger: System Development Tools: Lint, Make, SCCS (Source Code Control system), Language Development Tools: YACC, LEX, M4, Text Formatting Tools: nroff, troff, tbl, eqn, pic, Debugger tools: Dbx, Adb, Sdb, Strip and Ctrace.	8	CO5
Referen	ce Books:			
1. Par	ata, "Advanced Unix Pr	ogramming guide", BPB.		
2. Yas	shwantKanitkar, "Unix S	Shell Programming", BPB.		
3. Me	etaHandhi, TilakShetty,	Rajiv Shah "The 'C' Odyssey Unix-the open boundless C", BPB.		
4. Sur	nitabh Das, "Unix Conc	epts and applications". TMH.		
5. Mil	ke Joy, Stephen Jarvis, N	Aichael Luck, 'Introducing Unix and Linux", Palgrave Macmillan.		
6. Rac	chel Morgan, HaneryMc	Gilton, "Introducing Unix System V", TMH.		
e-Learn	ing Source:			
1. http	os://onlinecourses.swaya	m2.ac.in/aic20_sp05/		
2. http	os://www.udemy.com/co	purse/linux-unix-essentials-and-introduction-to-shell-scripting/		

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO- PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO																		
CO1	3	1		1		2	2						2	1				
CO2	1	2	3	2	3	1	1	1			1		2	1				
CO3	3	1		2		2	2						2	1				
CO4	2	1	1	2	2	1	2	1					2	1				
CO5	1	2	2	1	3	2	2				1		1	2				



Effective from Session: 2020	-21						
Course Code	CA455	Title of the Course	SOFTWARE ENGINEERING	L	Т	Р	С
Year	Ι	Semester	Ι	3	1	0	4
Pre-Requisite	NONE	Co-requisite	NONE				
Course Objectives	<ul> <li>To soft</li> <li>To ana</li> <li>To soft</li> <li>To terr</li> <li>To dev</li> </ul>	provide the concepts o ware engineering. give fundamental aspec lysis, design, coding, tes give knowledge of pra ware development. provide the practical kn so f software implement provide the practical kn elopment using models.	f software crisis, issues, characteristics, evolution and app ets of software development with respect to requirement e sting and maintenance. ctical implementation of software coding style and software nowledge in software design, object oriented design and s ntation and maintenance. owledge for ensuring the quality and reliability of software	olicatic nginee ure test oftwar during	on with pring, re ting stra e devel softwa	respect equirem ategies lopment re	t to ent for t in

	Course Outcomes
CO1	Learn the concepts of software crisis, issues, characteristics, evolution and application with respect to software engineering.
CO2	Know the fundamental aspects of software development with respect to requirement engineering, requirement analysis, design, coding,
	testing and maintenance.
CO3	Find the practical implementation of software coding style, design and software testing strategies.
CO4	Enhance the knowledge of management of software project from initial stage to final stage for software development.
CO5	Access the practical knowledge for ensuring the quality and reliability of software during software development using models.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Fundamental Concept on Software Engineering	Fundamental Concept on Software Engineering: Introduction to Software Engineering, Software Crisis, Software Problems, Software Engineering Problems, Characteristics of Software, Software Evaluation, Software Applications, Requirement Analysis and Requirement Specification Documents, Software Design, Coding, Testing, Maintenance, Validation and Verification, Monitoring and Control, Metrics and Measurement. Software Development Models: Waterfall Model, Prototyping Model, Interactive Enhancement Model, Spiral Model, Iterative Models, Evolutionary Process Models, Role of Management in Software Development and Problem Analysis.	8	COI
2	Software Design	Software Design: Design Process, Design Concepts, Design Model, Problem Partitioning and Hierarchy, Abstraction, Modularity, Top Down and Bottom Up Approach, Structure Design Methodology, Functional Approach, Object Oriented Approach, Coupling and Cohesion, Cyclomatic Complexity. Object Oriented Design: OO Analysis and OO Design, Classes and Objects, Relationship among Objects, Inheritance and Polymorphism, Design Concepts, Design Notation and Specification, Design Methodology, Dynamic Modeling,FunctionalModeling.	8	CO2
3	Software Coding	Software Coding: Programming Practice, Top Down and Bottom Up Structured Programming, Information Hiding, Programming Style, Internal Documentation, Size measures, Complexity Metrics, Style Metrics Software Testing: Testing Fundamentals, Top Down and Bottom Up Approaches, Functional Testing, Structural Testing, Test Cases and Test Criteria, Software Testing Strategies, Testing Levels, Unit Testing, Integration Testing and System Testing, Alpha and Beta Testing, Test Plan, Test Case Specification, Test Case ExecutionandAnalysis.	8	CO3
4	Software Maintenance and Software Project Management	Software Maintenance and Software Project Management: Software as an Evolutionary Entity, Need for Maintenance, Categories of Maintenance, Cost of Maintenance, Software Re-Engineering, Reverse Engineering, Software Configuration Management Activities, Change Control Process, Software Version Control, Estimation of various Parameters, Project Scheduling Staffing and Personal Planning, Constructive Cost Models (COCOMO), Resource Allocation Models, Software Risk Analysis and Management.	8	CO4
5	Software Reliability and Quality Assurance	Software Reliability and Quality Assurance: Software Reliability, Reliability Issues, Musa's Model, Software Quality, Reliability Growth, ISO 9000 Certification, SEI Capability Maturity Model, Comparison between ISO and CMMModel. CASE (Computer Aided Software Engineering): Various CASE Tools and their Usefulness, Role of Data Dictionary in CASE Tools, Architecture of CASE Environment, CASE Support in Software Life Cycle.	8	CO5
Referen	ce Books:			
1. Par	kajJalote, "Software En	gineering", NarosaPublications.		
2. Raj	ib Mall, "Fundamental	of Software Engineering",PHI.		
3. Rog	ger S. Pressman, "Softw	are Engineering: A practitioner's Approach", 7 Edition, McGraw Hill International Edition.		

- 4. Sommerville, "Software Engineering", 7th edition, PearsonEducation.
- 5. K.K. Agarwal and Yogesh Singh, "Software Engineering", New Age InternationalPublishers.
- 6. James F. Peters, WitoldPedrycz, "Software Engineering, an Engineering Approach", John Wiley.
- 7. ShelyCashman Rosenblatt, "Systems Analysis and Design", Thomson Publications.
- 8. Waman S Jawadekar, "Software Engineering Principles and Practice", TMH.

#### e-Learning Source:

- 1. https://onlinecourses.nptel.ac.in/noc20\_cs68/
- 2. https://nptel.ac.in/courses/106105087

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO- PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO																		
CO1	3	1		1		2	2						2	1				
CO2	3	1		2	1	1	1						1	2				
CO3	1	2	3	2	3	1	2	1			1		1	2				
CO4	2	1	1		1	1	2	3					2	1				
CO5	1	2	3	3	2	2	2	1			1		2	1				



Effective from Session: 2020	-21						
Course Code	CA456	Title of the Course	OPERATING SYSTEM	L	Т	P	С
Year	Ι	Semester	Ι	3	1	0	4
Pre-Requisite	NONE	Co-requisite	NONE				
Course Objectives	<ul> <li>To</li> <li>To</li> <li>To</li> <li>To</li> <li>To</li> <li>To</li> </ul>	study types of Operating learn Scheduling and Pr study Deadlock and Sto study about Virtual Mer learn Disc Management	g System and Process Management. ocess Synchronization. rage management. nory and File Management.				

	Course Outcomes
CO1	Explain the types of operating system and ability to create threads and perform interposes communication.
CO2	Understand CPU scheduling and able to solve process synchronization problems.
CO3	Understand issues surrounding deadlock handling and memory management.
CO4	Explain paging and segmentation methods suitable for virtual memory. Ability to manage files and directory.
CO5	Be able to recovery and manage disk spaces. Knowledge of files systems and Android OS.

8	CO1
8	CO2
8	CO3
8	CO4
8	CO5
	8 8 8 8

						С	ourse 4	Articul	ation N	Matrix:	(Mappi	ng of CO	s with PO	s and PSC	Ds)			
PO- PS O	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
C01	2.	1	3	1	1	2	1						2	1				
COI	-	-	5	-	-	-	-							-				
CO2	3	1		2		1	2	1					2	1				
CO3	3	2	1	1		2	1						2	1				
CO4	2	1	2	2	1	2	3	1			1		2	1				
CO5	1	2	1	3	2	2	2				1		2	2				



Effective from Session:2020-	-21						
Course Code	CA457	Title of the Course	COMPUTER ORGANIZATION AND ARCHITECTURE LAB	L	Т	Р	С
Year	Ι	Semester	Ι	0	0	3	2
Pre-Requisite	NONE	Co-requisite	CA452				
Course Objectives	<ul> <li>To</li> <li>To</li> <li>To</li> <li>To</li> <li>and</li> </ul>	impart basic understand introduce the concepts o develop Assembly langu Design and understand flip-flop	ing of the internal organization of 808 Microprocessor. f interfacing microprocessors with external devices hage programming skills. the behavior of digital circuits, Adder, subtractor decoder	Multiŗ	olexers	counter	[

	Course Outcomes
CO1	Build a program on a microprocessor using instruction set of 8086.
CO2	Analyze the behavior of digital circuits
CO3	Design digital circuits for basic components of computer system and applications
CO4	Describe the internal architecture and different modes of operations of a typical micro controller
CO5	Understand different addressing modes and instructions of 8086, design and develop assembly language programs using software interrupts,
	subroutines and macros

Exper iment No.	Title of the Experiment	Content of Unit	Contact Hrs.	Mapped CO					
1	Experiment-1	Study of 8085 and 8086/8088.	2	CO1					
2	Experiment-2	Study and Bread Board Realization of Logic Gates, K-Map, Flip-Flop equation	2	CO1					
3	3 Experiment-3 Implementation of Half Adder, Full Adder and Subtractor 2 CO2								
4	Experiment-4	Implementation of Ripple Counters and Registers.	2	CO2					
5	Experiment-5	Implementation of Decoder and Encoder circuits.	2	CO3					
6	Experiment-6	Implementation of Multiplexer and De-Multiplexer circuits.	2	CO4					
7	Experiment-7	Assembly Language programs for 8086/8088	2	CO5					
8	Experiment-8	Address and data transfer, Arithmetic Operation, Block Transfer	2	CO5					
Referen	ce Books:								
1. Ma	Mano Morris, "Computer System Architecture", PHI, Third Edition, 2017								
2. Kai	2. Kai Hwang, FayéAlayé Briggs," Computer Architecture and Parallel Processing", TMH, 2nd Edition 2017								
e-Learn	e-Learning Source:								
1. htt	1. https://nptel.ac.in/courses/106106166								
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2.	https://nptel.ac.in/courses/106105163

						С	ourse A	Articul	ation N	Aatrix:	(Mappi	ng of COs	s with PO	s and PSC	Ds)			
PO- PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO																		
CO1	1	2	3	2	3	2	1				1		2	2				
CO2	1	2	1	3	3	2	2	1					1	2				
CO3	1	2	3	2	2	1	2	1			1		2	1				
CO4	3	1	1	2		2	2						2	1				
CO5	1	2	3	3	3	2	2	2			1		2	1				



Effective from Session: 2020	Effective from Session: 2020-21						
Course Code	CA458	Title of the Course	C PROGRAMMING LAB	L	Т	Р	С
Year	Ι	Semester	Ι	0	0	3	2
Pre-Requisite	NONE	Co-requisite	CA453				
Course Objectives	<ul> <li>To</li> <li>To</li> <li>To</li> <li>To</li> <li>To</li> </ul>	understand basic concep learn the Concept of Va understand the Concept understand Concept of F understand Concept of F	ts of C programming, operators and expressions. rious Decision Control statements and loops. of Arrays and String Operations. Functions, Pointers, Structure, Union and Enumeration. File Handling				

#### **Course Outcome**

Course	outcomes
CO1	Simple programs to understand the concepts of data types, operations and expressions.
CO2	Familiarizing conditional and control statements.
CO3	Implementing Concept of array and String to solve problem.
CO4	Implementation of functions, pointers, operation on pointers and dynamic storage allocation.
CO5	Defining and handling structures, array of structures, union and processing data

Exper iment No.	Title of the Experiment	Content of Unit	Contact Hrs.	Mapped CO
1	Implementing Concept of Operators and Expressions	Program to demonstrate the working of arithmetic operators. Program to demonstrate the working of Increment and Decrement Operators. Program to demonstrate the working of Assignment, Relational, Logicaland Conditional operators.	3	CO1
2	Implementing Concept of Various Decision Control statements and loops.	Program to find Largest of Three Integers. Program to check whether the Given Number Is Palindrome OrNot Program to find whether the given integers A Prime Number An ArmstrongNumber	3	CO1
3	Program for triangle	Program for Pascal triangle. Program to find Sum of n Terms of Series n-n * $2/2! + n*3/3! - n*4/4! + \dots$	3	CO2
4	Implementing Concept of Arrays (Single and Double dimension)	Program to find Sum and Average of n integers using Linear Array. Program to perform Addition, Multiplication, Transpose on Matrices.	3	CO2
5	Implementing Concept of String operations	Program to perform following operations by using user defined functions Concatenation. Reverse. String Matching	3	CO3
6	Implementing Concept of Function and Recursive Function	Program to swap two values using Call by value. Call by reference. Program to calculate the Factorial of a Given Number.	3	CO3
7	Implementing Concept of Pointers.	Program to Sort the List of Integers using Dynamic Memory Allocation. Program to Display Weekdays Using Enumeration.	3	CO4
8	Implementing Concept of Structures	Program to Display the Marksheet of a Student Using Structure. Implementing Concept of Enumeration and Unions. Program to Store the Information of Student Using Union.	3	CO5
9	Implementing Concept of File Handling	Program to perform following operations on datafiles Read from data file. Write to datafile. Program to Copy the Content of One File to Another FileUsing Command Line Argument.	3	CO5
		Reference Books:		
1. Got	ttfried, "Programming in	n C", Schaum's Series Tata McGraw Hill.		
2. Kei	rnigham, Ritchie, "The C	C Programming Language", PHI.		
e-Learn	ing Source:	ac in/noc22_cs40/		
2. http://doi.org/10.1011	ps://onlinecourses.nptel	ac.in/noc19_cs42/		

						С	ourse	Articul	ation I	Matrix:	(Mappi	ng of CO	s with PO	s and PSC	Ds)			
PO- PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO1	2	1	3	2	3	2	1							2	1			
CO2	2	2	3	2	3	1	2	1						2	1			
CO3	1	3	3	2	2	1	1	1			1			2	2			
CO4	1	2	3	2	2	1	2	1			1			1	2			
CO5	3	1	2	2	2	1	2	1						2	1			



Effective from Session: 2020-2021							
Course Code	CA459	Title of the Course	UNIX/LINUX LAB	L	Т	Р	С
Year	Ι	Semester	Ι	0	0	2	1
Pre-Requisite	None	Co-requisite	CA454				
Course Objectives	<ul> <li>To</li> <li>To</li> <li>To</li> <li>To</li> <li>To</li> </ul>	learn basic commands o learn various syntax of s learn basic commands o learn basic commands o learn various Filter and	f UNIX system. hell programming and implement various concepts of shell f process management and implement system programming. f UNIX system Administration. Tools of UNIX system.	progra	mming.		

	<b>Course Outcomes</b>
CO1	Able to execute various commands and utilities of the UNIX operating system.
CO2	Able to implement shell scripts and automate various daily tasks using shell programming.
CO3	Able to implement system programming.
CO4	Able to execute UNIX system administration commands.
CO5	Develop applications using concepts of UNIX system.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO						
1.	Unix Commands	Miscellaneous Commands, File and Directory Related Commands, Communication and Disk Related Commands, Basic Filters	2	CO1						
2.	Shell Programming	Shell Script to accept two numbers and perform all arithmetic operations on it. Menu Based Shell Script. Shell Script to calculate the Gross Salary Shell Script through case statement. Shell Script to find the largest among numbers using positional parameters.	2	CO2						
3.	System Programming	Use the fork() to create the Process. Use the fork() to create the Child Process. Implementation of exec System Call. Implementation of Pipe. Implementation of Semaphore and message queue. Implement of Socket Programming	2	CO3						
4.	Loops	Shell Script to illustrate While, Until and For Loop.	2	CO4						
5.	Strings	Shell Script to perform String operations.	2	CO5						
Referen	ce Books:									
1. Parata, "Advanced Unix Programming guide", BPB.										
2. YashwantKanitkar, "Unix Shell Programming", BPB.										
e-Learn	ing Source:									
1. htt	ps://onlinecourses.sway	am2.ac.in/aic20_sp05/								

2. https://www.udemy.com/course/linux-unix-essentials-and-introduction-to-shell-scripting/

		Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO- PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO1	2	1	2	2	3	2	2						2	2				
CO2	1	2	3	2	3	1	2						2	1				
CO3	1	2	3	1	3	2	2						2	1				
CO4	2	1	2	2	3	2	2						2	1				
CO5	1	3	3	2	3	1	2						2	1				