

**Department of Information Science and Engineering****Course Outcomes and CO-PO-PSO Articulation Matrix****Batch 2020-24****Semester-I/II**

Subject: Programming in C & Data Structures													Subject Code: 18PCD13/23		
Course Outcomes															
C103.1	Achieve Knowledge on computers and basic concepts of networks.														
C103.2	Apply the basic principles of design and development of C Programming.														
C103.3	Design and development of modular programming skills.														
C103.4	Demonstrate Arrays and Strings in C programming concepts.														
C103.5	Illustrate the basic concepts of Structures, unions, Pointers and Preprocessor Directives.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C103.1	3	2	2											2	
C103.2	3	3	2	3										2	
C103.3	2	3	3	2	2									2	
C103.4	2	3	3	2										2	
C103.5	3	2	2	2										2	
C103	2.6	2.6	2.6	2.25	2									2	

Subject: Computer Programming Lab													Subject Code: 18CPL16/26		
Course Outcomes															
C106.1	Understand the knowledge on simple applications in C using conditional statements and looping concepts														
C106.2	Demonstrate and implement applications using arrays and strings														
C106.3	Apply knowledge on functions, recursions, pointers and structures.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C106.1	3	2	2	2										3	
C106.2	3	3	2	2										3	
C106.3	3	3	3	3	1									3	
C106	3.0	2.67	2.33	2.33	1.0									3	

Semester-III

Subject: Engineering Mathematics-III												Subject Code: 18MAT31				
Course Outcomes																
C201.1	Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems, and other fields of engineering.															
C201.2	Demonstrate the Fourier series to study the behavior of periodic functions and their applications in system communications, digital signal processing and field theory.															
C201.3	Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems. s															
C201.4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.															
C201.5	Determine the externals of functional using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.															
CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
C201.1	3	2														
C201.2	3	2														
C201.3	3	2														
C201.4	3	2														
C201.5	3	2														
C201	3	2														

Subject: Data Structures and Applications												Subject Code:18CS32				
Course Outcomes																
C202.1	Able to understand fundamentals of C language and definition of data structures															
C202.2	Analyze and demonstrate the stacks, queues operations and its applications															
C202.3	Create data storage using linked lists concepts and demonstrate its applications															
C202.4	Construct trees data structures and perform operations such as traversals, searching and expression evaluation.															
C202.5	Use graph based data structures approach for storing, sorting ,searching of data and understand file handling basics															
CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
C202.1	2	2	2										1			
C202.2	2	2	2										2			
C202.3	3	2	3		2								3			
C202.4	2	2	3	2									2			
C202.5	1	2	3	3	2								2			
C202	2	2	2.6	2.5	2								2			

Subject: ANALOG AND DIGITAL ELECTRONICS												Subject Code: 18CS33				
Course Outcomes																
C203.1	Make use the BJTs, Operational Amplifier circuits and their applications, ADC, DAC circuitswith its characteristics in the circuit configuration.															
C203.2	Implement the expressions in Combinational Logic circuit, Simplification Techniques using Karnaugh Maps, QuineMcClusky technique and Petricks Method.															
C203.3	Analyzing and discuss Operation of Decoders, Encoders, Multiplexers, Adders and Subtractors.															

C203.4	Demonstrate the Latches, Flip-Flops for designing Registers in different scenarios in digital circuits														
C203.5	Recognize the various complicated issues in respect of performance of Synchronous and Asynchronous counters in Sequential Circuits and design of State Table and graph.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C203.1	2	2	3	2									1		
C203.2	2	3		2									2		
C203.3	1		2	1									2		
C203.4	2		2	2	1								2		
C203.5	1	2		2	1								2		
C203	1.6	2.3	2.3	1.8	1								1.8		

Subject: COMPUTER ORGANIZATION										Subject Code:18CS34					
Course Outcomes															
C204.1	Learn basic organization of computer system.														
C204.2	Analyze different ways of communication between processor and I/O devices.														
C204.3	Design basic memory chip and demonstrate functioning of memory system.														
C204.4	Analyze simple arithmetic and logical units														
C204.5	Examine Hardwired control and micro program control and other computing systems.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C204.1	3	3											2		
C204.2	3	3											2		
C204.3	2	2	2										2		
C204.4	3	3	3										2		
C204.5	2	1											2		
C204	2.6	2.4	2.5										2		

Subject: SOFTWARE ENGINEERING										Subject Code:18CS35					
Course Outcomes															
C205.1	Design a software system, component, or process to meet desired needs within realistic constraints.														
C205.2	Assess professional and ethical responsibility.														
C205.3	Function on multi-disciplinary teams.														
C205.4	Using the techniques, skills, and modern engineering tools necessary for engineering practice.														
C205.5	Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems.														
CO-PO-PSO Mapping															
Cos	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C205.1	3	2	1	2		1	2			2	1	2	2		
C205.2	2	2	1	2		2	1	3		1		1	1	1	
C205.3	2	2	3	2		1	2	1		1		1	2		
C205.4	2	1	2	1	1	2	1			1			2		
C205.5	3	2	1	3		1	2	1		1	2	2	1		
C205	2.4	2	1.6	2	1	1.4	1.6	1.6		1.2	1.5	1.5	1.6	1	

Subject: Discrete Mathematical Structures												Subject Code:18CS36			
Course Outcomes															
C206.1	Verify the correctness of an argument using propositional of an argument using propositional and predicate logic and truth table.														
C206.2	Demonstrate the ability to solve problems using counting techniques and combinatorics in the context of discrete probability.														
C206.3	Solve problems involving recurrence relations and generating functions.														
C206.4	Construct proofs using direct proof, proof by contraposition, proof of contradiction, and proof by cases and mathematical induction.														
C206.5	Explain and differentiate graphs and trees.														
CO-PO-PSO Mapping															
Cos	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C206.1	3	2	2	3									3		
C206.2	3	3	2	3								1	2		
C206.3	2	3	3	2						1		1	3		
C206.4	2	3	-	2								1	2		
C206.5	3	2	3	2						1			2	2	
C206	2.6	2.3	2.0	2.4						1.0		1.0	2.4	2.0	

Subject: ANALOG AND DIGITAL ELECTRONICSLABORATORY												Subject Code:18CSL37			
Course Outcomes															
C207.1	Make Use of various Electronic devices like cathode ray oscilloscope, signal generators, digital trainer kit, multimeter and components like resistor, capacitor, op-amp and integrated circuit.														
C207.2	Rate yourself in Design and demonstrate various combinational logic circuits & sequential circuits														
C207.3	Design and demonstrate various types of counters and Registers using Flip-flops														
C207.4	Make Use of simulation package to design analog and digital circuits.														
C207.5	Understand the working and implementation of Code converter, Adder and Subtractor.														
CO-PO-PSO Mapping															
COs	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C207.1	1		3		2				1				2	1	
C207.2	1		3										2		
C207.3	2		2		1				2				2	1	
C207.4	1	3	1		2								2	2	
C207.5	2		2		1								2		
C207	1.4	3	2.2		1.5				1.5				2	1.33	

Subject: Data Structures Laboratory												Subject Code:18CSL38			
Course Outcomes															
C208.1	Able to implement linear and nonlinear data structures and understand its application.														
C208.2	Create and analyze searching algorithm in data structures.														
C208.3	Demonstrate data structure for solving real world problem.														
CO-PO-PSO Mapping															
COs	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C208.1	1	2											1		
C208.2	2	3	3	3									2		
C208.3	2	2	3	3									2		
C208	1.6	2.5	3	3									1.75		

Semester-IV

Subject: Engineering Mathematics-IV												Subject Code: 18MAT41			
Course Outcomes															
C209.1	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory														
C209.2	Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow visualization and image processing														
C209.3	Apply discrete and continuous probability distributions in analysing the probability models arising in engineering field.														
C209.4	Make use of correlation and regression analysis to fit a suitable mathematical model for the statistical data.														
C209.5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis.														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C209.1	3	2													
C209.2	3	2													
C209.3	3	2													
C209.4	3	2													
C209.5	3	2													
C209	3	2													

Subject: Design and analysis of Algorithms												Subject Code:18CS42			
Course Outcomes															
C210.1	Analyze and compare the running time of algorithms using asymptotic analysis														
C210.2	Able to describe and apply the method of divide-and-conquer and decrease-and-conquer strategies														
C210.3	Describe and apply and the dynamic programming and greedy strategy paradigm														
C210.4	Describe and apply backtracking and branch-and-bound approaches.														
C210.5	Interpret the efficient algorithms in common engineering design situations, NP, P class problems														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C210.1	2	3	3	2									2		
C210.2	2	3	3	3	2								3		
C210.3	2	3	3	3	2								2		
C210.4	2	3	2	3	2								3		
C210.5	2	3	3	2	2								2		
C210	2	3	2.8	2.6	2								2.4		

Subject: Operating Systems												Subject Code:18CS43			
Course Outcomes															
C211.1	Demonstrate need for OS and different types of OS														
C211.2	Apply suitable techniques for management of different resources														
C211.3	Analyze Deadlock characteristics and provide solution to deadlocks, process synchronization & monitors.														
C211.4	Investigate File allocation, Disk access strategies and different concepts of OS in platform of usage through case studies.														
CO-PO-PSO Mapping															
COs	POs												PSOs		

	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C211.1	3	2											2		
C211.2	3	3	2										2		
C211.3	2	3	3										2		
C211.4	2	3	3										2		
C211	2.5	2.75	2.66										2.0		

Subject: Microcontroller and Embedded Systems **Subject Code:18CS44**

Course Outcomes

C212.1	Apply the architectural features and instructions of ARM microcontroller, by gaining the knowledge and programming ARM for different applications.
C212.2	Examine the various Interfaces with external devices and I/O instructions with ARM microcontroller.
C212.3	Interpret the basic hardware components based on the characteristics and attributes of an embedded system with firmware design approaches.
C212.4	Demonstrate the need of real time operating system for embedded system applications.

CO-PO-PSO Mapping

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C212.1	3	2											2		
C212.2		3	3	2	2								2		
C212.3	2	3	3										2		
C212.4	2	3	3										2		
C212	2.333	2.75	3	2	2								2		

Subject: Object Oriented Concepts **Subject Code:18CS45**

Course Outcomes

C213.1	Explain the object-oriented concepts using C++ and JAVA
C213.2	Develop computer programs to solve real world problems in C++.
C213.3	Develop computer programs to solve real world problems by using multithreading and exception handling, event handling in Java.
C213.4	Develop simple GUI interfaces for a computer program to interact with users, and to understand the event-based GUI handling principles using Applets and swings.

CO-PO-PSO Mapping

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C213.1	2	3	3	2									2		
C213.2	3	3	3	2	2								2		
C213.3	2	3	3	3	2	2							2		
C213.4	3	3	3	3	2								2		
C213	2.5	3	3	2.5	2	2							2		

Subject: Data Communication **Subject Code:18CS46**

Course Outcomes

C214.1	Identify the different types of network topologies, layers functionalities, encoding schemes
C214.2	Compare and contrast conversion techniques (A/D, D/D), bandwidth utilization methods and types of switched networks
C214.3	Analyze error detection techniques; understand working of Data Link layer protocols.
C214.4	Examine MAC Protocols and Ethernet technologies
C214.5	Understand basics of wireless networks, internetworking principles and Internet protocols IPV4, IP6 and ICMP operations

CO-PO-PSO Mapping

COs	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C214.1	1	1											2		
C214.2	2	3											2		
C214.3	2	3											3		
C214.4	2	2											3		
C214.5	2	2											3		
C214	1.8	2.2											2.6		

Subject: Design and analysis of Algorithms Lab	Subject Code:18CSL47
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Course Outcomes

C215.1	Analyze the running time of sorting problems and able to apply implementation of design techniques
C215.2	Design algorithms using appropriate design techniques divide and conquer, greedy, dynamic programming, and Backtracking etc
C215.3	Implement a variety of algorithms such as sorting, graph related problems using python or java language.
C215.4	Analyze and compare the performance of algorithms and Apply learned algorithms design techniques and data structures to solve real world problems

CO-PO-PSO Mapping

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C215.1	2	3	3	3	3								2		
C215.2	2	3	3	3	3								3		
C215.3	2	3	3	3	3								2		
C215.4	2	3	3	3	3								3		
C215	2	3	3	3	3								2.5		


Subject: Microcontroller and Embedded Systems Laboratory	Subject Code:18CSL48
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Course Outcomes

C216.1	Write and test the mathematical programs on LPC 2148 through ARM instruction set.
C216.2	Examine the experiments on LPC 2148 evaluation board using embedded C and keilµvision 4.
C216.3	Analyze the experiments by interfacing the hardware components using ARM instruction set.

CO-PO-PSO Mapping

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C216.1	3		2						2	2			2		
C216.2			3		2				2				2		
C216.3	3		2						2	2			2		
C216	3		2.333		2				2	2			2		


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