



**Department of Information Science and Engineering**

**Course Outcomes and CO-PO-PSO Articulation Matrix**

**Batch 2018-22**

**Course Outcomes and CO-PO-PSO Articulation Matrix**

**Batch 2018-22**

**Semester-I/II**

<b>Subject: Programming in C &amp; Data Structures</b>												<b>Subject Code: 18PCD13/23</b>				
<b>Course Outcomes</b>																
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.															
<b>CO-PO-PSO Mapping</b>																
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		

<b>Subject: Computer Programming Lab</b>												<b>Subject Code: 18CPL16/26</b>				
<b>Course Outcomes</b>																
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.															
<b>CO-PO-PSO Mapping</b>																
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		



	Karnaugh Maps, QuineMcClusky technique and Petricks Method.														
<b>C203.3</b>	Analyzing and discuss Operation of Decoders, Encoders, Multiplexers, Adders and Subtractors.														
<b>C203.4</b>	Demonstrate the Latches, Flip-Flops for designing Registers in different scenarios in digital circuits														
<b>C203.5</b>	Recognize the various complicated issues in respect of performance of Synchronous and Asynchronous counters in Sequential Circuits and design of State Table and graph.														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
<b>C203.1</b>	2	2	3	2									1		
<b>C203.2</b>	2	3		2									2		
<b>C203.3</b>	1		2	1									2		
<b>C203.4</b>	2		2	2	1								2		
<b>C203.5</b>	1	2		2	1								2		
<b>C203</b>	<b>1.6</b>	<b>2.3</b>	<b>2.3</b>	<b>1.8</b>	<b>1</b>								<b>1.8</b>		

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

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

<b>Subject: Discrete Mathematical Structures</b>										<b>Subject Code:18CS36</b>					
<b>Course Outcomes</b>															
C206.1	Verify the correctness 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.														
<b>CO-PO-PSO Mapping</b>															
Cos	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C206.1	3	2	2	3									1	2	3
C206.2	3	3	2	3									3		
C206.3	2	3	3	2								1	2		
C206.4	2	3	-	2						1		1	3		
C206.5	3	2	3	2								1	2		
C206	2.6	2.3	2.0	2.4						1			2	2	
										1.0		1.0	2.4	2.0	

<b>Subject: ANALOG AND DIGITAL ELECTRONICSLABORATORY</b>										<b>Subject Code:18CSL37</b>					
<b>Course Outcomes</b>															
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.														
<b>CO-PO-PSO Mapping</b>															
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		
C207.4	1	3	1		2								2	1	
C207.5	2		2		1								2	2	
C207	1.4	3	2.2		1.5				1.5				2	1.33	

<b>Subject: Data Structures Laboratory</b>										<b>Subject Code:18CSL38</b>					
<b>Course Outcomes</b>															
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.														
<b>CO-PO-PSO Mapping</b>															
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**

<b>Subject: Engineering Mathematics-IV</b>													<b>Subject Code: 18MAT41</b>						
<b>Course Outcomes</b>																			
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.																		
<b>CO-PO-PSO Mapping</b>																			
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																	

<b>Subject: Design and analysis of Algorithms</b>													<b>Subject Code:18CS42</b>					
<b>Course Outcomes</b>																		
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 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																	
<b>CO-PO-PSO Mapping</b>																		
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					

<b>Subject: Operating Systems</b>													<b>Subject Code:18CS43</b>					
<b>Course Outcomes</b>																		
C211.1	Demonstrate need for OS and different types of OS																	

<b>C211.2</b>	Apply suitable techniques for management of different resources														
<b>C211.3</b>	Analyze Deadlock characteristics and provide solution to deadlocks, process synchronization & monitors.														
<b>C211.4</b>	Investigate File allocation, Disk access strategies and different concepts of OS in platform of usage through case studies.														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
<b>C211.1</b>	3	2											2		
<b>C211.2</b>	3	3	2										2		
<b>C211.3</b>	2	3	3										2		
<b>C211.4</b>	2	3	3										2		
<b>C211</b>	<b>2.5</b>	<b>2.75</b>	<b>2.66</b>										<b>2.0</b>		

<b>Subject: Microcontroller and Embedded Systems</b>												<b>Subject Code:18CS44</b>			
<b>Course Outcomes</b>															
<b>C212.1</b>	Apply the architectural features and instructions of ARM microcontroller, by gaining the knowledge and programming ARM for different applications.														
<b>C212.2</b>	Examine the various Interfaces with external devices and I/O instructions with ARM microcontroller.														
<b>C212.3</b>	Interpret the basic hardware components based on the characteristics and attributes of an embedded system with firmware design approaches.														
<b>C212.4</b>	Demonstrate the need of real time operating system for embedded system applications.														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
<b>C212.1</b>	3	2											2		
<b>C212.2</b>		3	3	2	2								2		
<b>C212.3</b>	2	3	3										2		
<b>C212.4</b>	2	3	3										2		
<b>C212</b>	<b>2.333</b>	<b>2.75</b>	<b>3</b>	<b>2</b>	<b>2</b>								<b>2</b>		

<b>Subject: Object Oriented Concepts</b>												<b>Subject Code:18CS45</b>			
<b>Course Outcomes</b>															
<b>C213.1</b>	Explain the object-oriented concepts using C++ and JAVA														
<b>C213.2</b>	Develop computer programs to solve real world problems in C++.														
<b>C213.3</b>	Develop computer programs to solve real world problems by using multithreading and exception handling, event handling in Java.														
<b>C213.4</b>	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.														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
<b>C213.1</b>	2	3	3	2									2		
<b>C213.2</b>	3	3	3	2	2								2		
<b>C213.3</b>	2	3	3	3	2	2							2		
<b>C213.4</b>	3	3	3	3	2								2		
<b>C213</b>	<b>2.5</b>	<b>3</b>	<b>3</b>	<b>2.5</b>	<b>2</b>	<b>2</b>							<b>2</b>		

<b>Subject: Data Communication</b>												<b>Subject Code:18CS46</b>			
<b>Course Outcomes</b>															

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														
<b>CO-PO-PSO Mapping</b>															
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		

<b>Subject: Design and analysis of Algorithms Lab</b>												<b>Subject Code:18CSL47</b>			
<b>Course Outcomes</b>															
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														
<b>CO-PO-PSO Mapping</b>															
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		

<b>Subject: Microcontroller and Embedded Systems Laboratory</b>												<b>Subject Code:18CSL48</b>			
<b>Course Outcomes</b>															
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.														
<b>CO-PO-PSO Mapping</b>															
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		

Semester-V

<b>Subject: M&amp;E for IT Industry</b>												<b>Subject Code: 18CS51</b>			
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<b>Course Outcomes</b>															
<b>C301.1</b>	Ability to manage people, processes, and resources within a diverse organization, knowledge about planning, staffing, organization, entrepreneur.														
<b>C301.2</b>	Demonstrate an ability to engage in critical thinking by analyzing situations and constructing and selecting viable solutions to solve problems and to work effectively with others														
<b>C301.3</b>	Applying knowledge of current information, theories and models, techniques and practices in all of the major business disciplines including the general areas of Accounting and Finance, Information Technologies, Management, Marketing, and Quantitative Analysis.														
<b>C301.4</b>	Demonstrate knowledge of utilizing the resources available effectively through ERP and make use of IPRs and institutional support in entrepreneurship														
<b>C301.5</b>	Adopting of the key steps in the elaboration of business idea, and about the small scale industries and prepare the project report.														
<b>CO-PO-PSO Mapping</b>															
COs	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C301.1	2					2			2	2		2	1	2	
C301.2	2					2			2	1		2	2	1	
C301.3	2	1		1								2		1	
C301.4	2			1	1						1	1	2	1	
C301.5	2			1								2	1	2	
C301	2	1		1	1	2			2	1.5	1	1.8	1.5	1.4	

<b>Subject: Computer Network and Security</b>												<b>Subject Code: 18CS52</b>			
<b>Course Outcomes</b>															
<b>C302.1</b>	Examine the principles of application layer protocols.														
<b>C302.2</b>	Recognize transport layer services and infer UDP, TCP protocols.														
<b>C302.3</b>	Analyze router functionality, IP addressing and routing algorithms in network layer.														
<b>C302.4</b>	Explore various network security algorithms and analyze.														
<b>C302.5</b>	Examine and analyze multimedia networking concepts.														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C302.1	2												2		
C302.2			2			3							3		
C302.3		2											2		
C302.4				3									2		
C302.5					3								3		
C302	2.0	2.0	2.0	3.0	3.0	3.0							2.4		

<b>Subject: Data Base Management Systems</b>												<b>Subject Code: 18CS53</b>			
<b>Course Outcomes</b>															
<b>C303.1</b>	Illustrate the database design for applications														
<b>C303.2</b>	Make use of ER Diagrams and Normalization techniques in DB Applications														
<b>C303.3</b>	Apply concurrency control and recovery mechanism for data base problems														
<b>C303.4</b>	Apply various concepts in Query processing.														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C303.1	3	3													
C303.2	2	3		2		3									



C303.3	3	3	3			2									
C303.4	2	2													
C303	2.5	2.6	3	2		2.5									

<b>Subject: Automata Theory and Computability</b>													<b>Subject Code: 18CS54</b>		
<b>Course Outcomes</b>															
C304.1	Formulate a problem with respect to different models of computation														
C304.2	Compare the different models of Computation like Deterministic, Non-deterministic and Software models (Finite Automata, PDA and Turing Machine).														
C304.3	Design Grammars and Automata for different language classes and become knowledgeable about restricted models of Computation (Regular, Context Free) and their relative powers														
C304.4	Develop skills in formal reasoning and reduction of a problem to a formal model, with an emphasis on semantic precision and conciseness.														
C304.5	Formulate a problem with respect to different models of Computation.														
<b>CO-PO-PSO Mapping</b>															
COs	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C304.1	2	2	1	3									2		
C304.2	2	3	2	2									2		
C304.3	2	3	2	1								2	2		
C304.4	3	2	2	2								2	2		
C304.5	2	2	2	2								2	2		
C304	2.2	2.4	1.8	2								2	2		

<b>Subject: Application Development using Python</b>													<b>Subject Code: 18CS55</b>		
<b>Course Outcomes</b>															
C305.1	Apply Python syntax and semantics, flow control, functions, strings, files and object oriented concepts to build applications.														
C305.2	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions														
C305.3	Develop exemplary applications related to Web scraping, Documents and JSON in Python.														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C305.1	2														
C305.2		2													
C305.3			2	2	2							1		2	
C305	2	2	2	2	2							1		2	

<b>Subject: Unix Programming</b>													<b>Subject Code: 18CS56</b>		
<b>Course Outcomes</b>															
C306.1	Explain Unix Architecture, file system and Basic commands														
C306.2	Illustrate shell programming and write shell scripts														
C306.3	Categorize, compare and make use of Unix system calls														
C306.4	Build an application/service over a Unix system														
<b>CO-PO-PSO Mapping</b>															
COs	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C306.1	1	1													
C306.2	1		2		2								1		
C306.3	1	1	1										1		

C306.4			2		2				1				1		
C306	1	1	1.667		2				1				1		

<b>Subject: COMPUTER NETWORKS LABORATORY</b>												<b>Subject Code: 18CSL57</b>			
<b>Course Outcomes</b>															
C307.1	Analyze and compare various networking algorithms to secure data.														
C307.2	Demonstrate the concepts of client server communications through socket programming.														
C307.3	Analyze the different parameters of network configuration.														
C307.4	Analyze transport layer protocols to evaluate congestion in network.														
C307.5	Demonstrate the performance of CDMA and GSM using NS2/NS3.														
C307.6	Implement ethernet LAN and ESS in wireless LAN through simulation using NS2/Ns3.														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C307.1	2	3											1		
C307.2	2			2									2		
C307.3		3	2	2									2		
C307.4		3	2	2									2		
C307.5		2			2								2		
C307.6		2			2								2		
C307	2.0	2.2	2.0	2.0	2.0								1.83		

<b>Subject: Data Base Management Systems Lab</b>												<b>Subject Code:18CSL58</b>			
<b>Course Outcomes</b>															
C308.1	Infer database language commands to create simple database														
C308.2	Analyze the database using queries to retrieve records														
C308.3	Apply pl/sql for processing database														
C308.4	Analyze front ends tools to design forms, report and menus.														
C308.5	Develop solutions using database concepts for real time requirements.														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C308.1	3	3			3										
C308.2	2	3		2	3	2									
C308.3	2	2			2	2		3							
C308.4	2	2	2	2	2	2									
C308.5	3	2	2	3	3	2									
C308	2.5	2.5	2	2.5	2.6	2		3							

### Semester-VI

<b>Subject: FILE STRUCTURES</b>												<b>Subject Code:18IS61</b>		
<b>Course Outcomes</b>														
C309.1	Explain different techniques for organizing and manipulation of data in secondary storage which include basic file structure concepts, file operations, secondary storage device and software system.													
C309.2	Illustrate management of records and organization of files for performance by applying object-oriented concepts													
C309.3	Compare primary and secondary indexing and construct model for implementing consequential processing and sorting large files.													
C309.4	Construct B-trees and illustrate indexed sequential access and prefix B+ trees with appropriate data													

	structures.														
C309.5	Discuss hashing and its demonstrate collision resolution using differing techniques.														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C309.1	1												2		
C309.2			1										2		
C309.3		3	3										2		
C309.4		3	3										2		
C309.5	1	3	3										2		
C309	1	3	2.5										2		

<b>Subject: SOFTWARE TESTING</b>												<b>Subject Code: 18IS62</b>			
<b>Course Outcomes</b>															
C310.1	Understanding basic terminologies of software testing methods														
C310.2	Derive test cases for any given problem using black box and white box testing														
C310.3	Understanding and apply different levels of testing														
C310.4	Identify the needs of testing process framework														
C310.5	Understanding the need of documenting and analysis and test														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C310.1	1	1											1		
C310.2		2	2										2		
C310.3	2			1	2								2		
C310.4	1	2											2		
C310.5									1	1	1		1		
C310	1.3	1.6	2	1	2				1	1	1		1.6		

<b>Subject: WEB TECHNOLOGY AND ITS APPLICATIONS</b>												<b>Subject Code: 18CS63</b>			
<b>Course Outcomes</b>															
C311.1	Illustrate the Semantic Structure of HTML and CSS														
C311.2	Compose forms and tables using HTML and CSS														
C311.3	Design Client-Side programs using JavaScript and Server-Side programs using PHP														
C311.4	Infer Object Oriented Programming capabilities of PHP														
C311.5	Examine JavaScript frameworks such as jQuery, JSON, XML and Backbone														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C311.1	3		3												
C311.2		3	3	3											
C311.3		3	3									2		2	
C311.4	1	2	2	2									2		
C311.5			2										2	2	
C311	2	2.6	2.6	2.5								2	2	2	

<b>Subject: Data mining and Data Warehousing</b>												<b>Subject Code: 18CS641</b>			
<b>Course Outcomes</b>															
C312.1	Understand the basic concepts of data mining and data warehousing														

C312.2	Identify datamining problems and implement the data warehouse														
C312.3	Write association rules for a given data pattern														
C312.4	Describe the classification and clustering techniques														
C312.5	Choose between classification and clustering solution for a given problem														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C312.1	3												1	2	3
C312.2		2											2		
C312.3			3						1						
C312.4		2	2			2							1		
C312.5	3	2											1		
C312	3	2	2.5			2			1				1	2	

Subject: CLOUD COMPUTING												Subject Code: 18CS643			
<b>Course Outcomes</b>															
C313.1	Explore the concepts and terminologies of cloud computing														
C313.2	Examine and understand Cloud framework and technologies														
C313.3	Analyze data intensive computing														
C313.4	Explore cloud applications														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C313.1	2	2											1	2	3
C313.2	2	2	2		3								2		
C313.3	2		3		3								2		
C313.4	1	2	2		3								2		
C313	1.75	2	2.33	1	3								2		

Subject: Advance JAVA and J2EE												Subject Code:18CS644			
<b>Course Outcomes</b>															
C314.1	Understand Java Concepts like enumerations and strings in developing modular programs														
C314.2	Illustrate use of collection framework in developing modular programs.														
C314.3	Understand string handling mechanism														
C314.4	Develop web applications														
C314.5	Illustrate use of database connectivity														
<b>CO-PO-PSO Mapping</b>															
COs	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C314.1	1	1											1	2	3
C314.2	2	1	1										1		
C314.3		2	1	1									1		
C314.4		2	2		2								1		
C314.5		2	2		2				2				2		
C314	1.5	1.6	1.5	1	2				2				2		

Subject: MOBILE APPLICATION DEVELOPMENT												Subject Code: 18CS651			
<b>Course Outcomes</b>															
C315.1	Create, test and debug Android application by setting up Android development environment														
C315.2	Implement adaptive, responsive user interfaces that work across a wide range of devices														

<b>C315.3</b>	Demonstrate how to get internet connectivity, learning to manage tasks and sending notifications														
<b>C315.4</b>	Demonstrating methods in storing, sharing and retrieving data in android applications.														
<b>C315.5</b>	Analyze performance of android applications and understand the role of permissions and security and Publishing android application in real world														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
<b>C315.1</b>	2		3		2				2	2			2		
<b>C315.2</b>	2		3		2				2				2		
<b>C315.3</b>	1		1		2				1				2		
<b>C315.4</b>	2		3		2				2	2			2		
<b>C315.5</b>	2	2	3	2	2								2		
<b>C315</b>	1	2	3	2	2								2	2	

<b>Subject: PROGRAMMING IN JAVA</b>												<b>Subject Code: 18CS653</b>			
<b>Course Outcomes</b>															
<b>C316.1</b>	Explain the object-oriented concepts using C++ and JAVA														
<b>C316.2</b>	Develop computer programs to solve real world problems in C++.														
<b>C316.3</b>	Develop computer programs to solve real world problems by using multithreading and exception handling, event handling in Java.														
<b>C316.4</b>	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.														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
<b>C316.1</b>	2	3	3	2											
<b>C316.2</b>	3	3	3	2	2										
<b>C316.3</b>	2	3	3	3	2	2									
<b>C316.4</b>	3	3	3	3	2										
<b>C316.1</b>	2.2	2.2	2.2	2.2	2.3	2.0									

<b>Subject: SOFTWARE TESTING LABORATORY</b>												<b>Subject Code:18ISL66</b>			
<b>Course Outcomes</b>															
<b>C317.1</b>	List out the requirements for the given problem														
<b>C317.2</b>	Design and implement the solution for given problem in any programming language														
<b>C317.3</b>	Apply the appropriate technique for the design test cases														
<b>C317.4</b>	Derive test cases for any given problem														
<b>C317.5</b>	Create appropriate document for test cases														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
<b>C317.1</b>	1	2											1		
<b>C317.2</b>		2	3	2									2		
<b>C317.3</b>			3	1									2		
<b>C317.4</b>		1	2	1									2		
<b>C317.5</b>									1	1	1		1		
<b>C317</b>	1	1.6	2.6	1.3					1	1	1		1.6		

<b>Subject: File Structures Laboratory with mini project</b>												<b>Subject Code:18ISL67</b>			
<b>Course Outcomes</b>															

C318.1	Implement different data organization and manipulation techniques on files														
C318.2	Design and develop indexing and consequential processing for data management in file														
C318.3	Build an application using file organization technique.														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C318.1		1	2		2								2		
C318.2		1	2		2								2		
C318.3		1	2		2				2	2	1	1	2		
C318		1	2		2				2	2	1	1	2		

<b>Subject: Mobile Application Development</b>										<b>Subject Code:18CSMP68</b>					
<b>Course Outcomes</b>															
C319.1	Create, test and debug Android application by setting up Android development environment.														
C319.2	Implement adaptive, responsive user interfaces that work across a wide range of devices.														
C319.3	Demonstrate methods in storing, sharing and retrieving data in Android applications.														
C319.4	Infer the role of permissions and security for Android applications.														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C319.1	3	2	2		2	1			1	1		1			
C319.2	3	2	2		2	1			1	1		1			
C319.3	3	2	2		2	1			1	1		1			
C319.4	3	2	2					2	1	1		1			
C319	3	2	2		2	1		2	1	1		1			

### Semester-VII

<b>Subject: Artificial Intelligence &amp; Machine Learning</b>										<b>Subject Code:18CS71</b>					
<b>Course Outcomes</b>															
C401.1	Understanding the theory of Artificial Intelligence(AI) and basic concepts of machine learning(ML) and its types.														
C401.2	Identify optimal techniques suitable for a given problem.														
C401.3	Illustrate AI and ML learning algorithms.														
C401.4	Apply machine learning techniques towards real world data analysis.														
C401.5	Design an application using machine learning methods.														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C401.1	3	3										1	2		
C401.2		2			2								2		
C401.3	2												1		
C401.4	2	2			2							2	2		
C401.5			3	1								1	1		
C401	2.33	2.33	3	1	2							1.5	1.6		

<b>Subject: BIG DATA AND ANALYTICS</b>										<b>Subject Code:18CS72</b>					
<b>Course Outcomes</b>															

C402.1	Understand fundamentals of Big Data analytics
C402.2	Investigate Hadoop framework and Hadoop Distributed File system
C402.3	Illustrate the concepts of NoSQL using MongoDB and Cassandra for Big Data
C402.4	Demonstrate MapReduce programming model to process the big data along with Hadoop tools
C402.5	Use machine learning algorithms for Big Data Analytics, Web Mining and Social Network Analysis with relevant visualization tools

**CO-PO-PSO Mapping**

COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
C402.1		2														
C402.2		2			1								1			
C402.3		2														
C402.4		1			2											
C402.5		2		1	2								1			
C402		1.8		1	1.6								1			

**Subject: USER INTERFACE DESIGN**

**Subject Code:18CS734**

**Course Outcomes**

C403.1	Characterize and differentiate the User Interface principles and design standards.
C403.2	Design the menu creation and navigations.
C403.3	Design the windows creation and analyze operations.
C403.4	Analyze and Establish connection between various screen based controls.

**CO-PO-PSO Mapping**

COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
C403.1	2		2										2			
C403.2			3										2			
C403.3			3										2			
C403.4		3											2			
C403	2.0	3.0	2.77										2.0			

**Subject: NATURAL LANGUAGE PROCESSING**

**Subject Code:18CS743**

**Course Outcomes**

C404.1	Apply the natural language text at word level and syntactic structures to develop simple and complex applications
C404.2	Analyze the natural language text at word level and syntactic structures.
C404.3	Identify the concepts of Text mining.
C404.4	Apply information retrieval techniques to develop applications.

**CO-PO-PSO Mapping**

COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
C404.1	2	2											2			





C407.1	Interpret the impact and challenges posed by IoT networks leading to new architectural models														
C407.2	Compare and contrast the deployment of smart objects and the technologies to connect them to network.														
C407.3	Appraise the role of IoT protocols for efficient network communication.														
C407.4	Elaborate the need for Data Analytics and Security in IoT.														
C407.5	Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C407.1	3	2	2	2	1	3									
C407.2	2	2		2		2									
C407.3	1	3	3	1		1									
C407.4	1	2	2	1	2	1									
C407.5	2	1	3	2		2									
C407	2.7	2.8	2.6	2.7	2.9	2.7									

<b>Subject: SAN</b>												<b>Subject Code:18CS822</b>			
<b>Course Outcomes</b>															
C408.1	Identify key challenges in managing information and analyze different storage networking technologies and virtualization														
C408.2	Explain components and the implementation of NAS														
C408.3	Describe CAS architecture and types of archives and forms of virtualization														
C408.4	Illustrate the storage infrastructure and management activities														
C408.5	Analyze the components of cloud computing showing how business agility in an organization can be created														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C408.1	2	2	2										2		
C408.2				2					1		1		1		
C408.3					2							1	1		
C408.4											1		2		
C408.5						1	1	1					2		
C408	2	2	2	2	2	1	1	1	1		1	1	1.6		

<b>Subject: NoSQL Database</b>												<b>Subject Code:18CS823</b>			
<b>Course Outcomes</b>															
C409.1	Introduce to NoSQL, Learning Basics and comparison with Relational Databases. Define, compare and use the four types of NoSQL Databases (Document-oriented, Key Value Pairs, Column-oriented and Graph databases).														
C409.2	Explain the Distribution Models and data replication and Consistency														
C409.3	Illustrate the Map Reduce processing technique and Key Value Databases with examples.														
C409.4	Explain the detailed architecture, define objects, load data, query data and performance tune Document-oriented NoSQL databases														

C409.5	Understanding of Graph database and data models.														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C409.1	1	1			1							1			
C409.2	2	1	1		2							1	1		
C409.3	1	2	1		1							2			
C409.4	2	1	1		1							1	1		
C409.5	1	1	1		1							1	1		
C409	1.4	1.2	1		1.2							1.2	1		

<b>Subject: INTERNSHIP/ PROFESSIONAL PRACTICE</b>										<b>Subject Code:18CS185</b>					
<b>Course Outcomes</b>															
C410.1	Apply domain knowledge in proposing solution for IT problem.														
C410.2	Develop/implement the design with appropriate techniques, resources and contemporary tools and deliver solution with stipulated planning.														
C410.3	Make the graduates work in collaboration/multidisciplinary environment.														
C410.4	Construct an integrity and ethical behavior during preparation of Technical document/Report/development of solution.														
C410.5	Discuss and make formal and informal communications with guide, make presentations and prepare technical document.														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C410.1	3	2	3										3		
C410.2	2	2		3									2		
C410.3	1			2					2				1		
C410.4	2			2	2								2		
C410.5	2							2				2	1		
C410	2	2	3	2.33	2			2	2			2	1.8		

<b>Subject: PROJECT WORK II</b>										<b>Subject Code:18ISP85</b>					
<b>Course Outcomes</b>															
C411.1	Discover Potential research areas in the field of IT.														
C411.2	Conduct a Survey of Several available literature in the preferred field of study.														
C411.3	Compare and contrast the several existing solutions for research challenge.														
C411.4	Demonstrate an ability to work in teams and manage the conduct of the research study.														
C411.5	Formulate and purpose a plan for creating a solution for the research plan identified and to report and present the findings of the study conducted in the preferred domain.														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
C411.1	3	2	2	2								2	2	2	
C411.2	2	3	2	1	1							1	1	2	
C411.3	3	3	3	1	2							2	1	3	

C411.4	2	2	3								1	1	2		
C411.5	2	3	3	1							2	2	2		
C411	2.4	2.6	2.6	1.25	1.5						1.6	1.4	2.2		

<b>Subject: TECHNICAL SEMINAR</b>											<b>Subject Code:18ISS86</b>				
<b>Course Outcomes</b>															
C412.1	Identify and Analyze information about emerging technologies with respect to current trends.														
C412.2	Identify promising new directions of various cutting edge technologies with intrapersonal skills.														
C412.3	Communicate effectively to a diverse audience, exhibit effective communication skills.														
C412.4	Understand appropriate modern engineering and IT Tools in new innovations and inventions.														
C412.5	Develop technique by imparting skills in preparing detailed report and describing the topic along with results.														
<b>CO-PO-PSO Mapping</b>															
<b>COs</b>	<b>POs</b>												<b>PSOs</b>		
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>1</b>	<b>2</b>	<b>3</b>
C412.1	1	2		1					2			3	2		
C412.2	1	2		1					2			3	2		
C412.3	1	2		1					2	3		3	2		
C412.4	1	2		1					2			3	2		
C412.5	1	2		1					2			3	2		
C412	1	2		1					2	3		3	2		



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