

**Department of Computer Science and Engineering****Course Outcomes and CO-PO-PSO Articulation Matrix****Batch 2016-20****Semester-I/II**

Subject: Programming in C & Data Structures											Subject Code:15PCD13/23				
Course Outcomes															
CO-1	Achieve knowledge of design and development of C problem solving skills.														
CO-2	Analyze various system models in design and implementation														
CO-3	Understand basic principles of programming in C language														
CO-4	Design and development of modular programming skills														
CO-5	Effective utilization of memory using pointer technology														
CO-PO-PSO Mapping															
COs	POs										PSOs				
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2		2									2	2		
CO2	2		2										2		
CO3	2		1										2		
CO4	2		2										2		
CO5	3		2									1	2		
Average	2.2		1.8									1.5	2		

Subject: Computer Programming Laboratory											Subject Code:15CPL16/26				
Course Outcomes															
CO-1	Construct a programming solution to the given problem using C														
CO-2	Identify and correct the syntax and logical errors in C programs														
CO-3	Modularize the given problems using pointers , functions and structures														
CO-PO-PSO Mapping															
COs	POs										PSOs				
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3												2		
CO2		2											2		
CO3		2											2		
Average	3	2											2		

**Semester-III**

Subject: Engineering Mathematics-III											Subject Code:15MAT31				
Course Outcomes															
CO1	Know the use of periodic signals and Fourier series to analyze circuits and systems communication.														
CO2	Explain the general linear system theory for continuous - time signals and digital signal processing using the Fourier transform and z-transform.														
CO3	Employ appropriate numerical methods to solve algebraic and transcendental equations.														
	Apply Green's theorem, Divergence theorem and Stokes theorem in various applications in the														

**CO5** Determine the external of functional and solve the simple problems for calculus of variations. Utilize the concepts of functional and their variations in the applications of communication systems, decision theory, synthesis and optimization of digital circuits.

**CO-PO-PSO Mapping**

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2													
CO2	3	2													
CO3	3	2													
CO4	3	2													
CO5	3	2													
Average	3	2													

**Subject: Analog and Digital Electronics**

**Subject Code: 15CS32**

**Course Outcomes**

- CO 1 Define and explain the current voltage characteristics of semiconductor and analog devices.
- CO 2 Demonstrate the combinational and sequential logic circuits by using various logical blocks.
- CO-3 Design and Compare various digital data communication efficiency using Data Processing Circuits.
- CO-4 Apply various methods to get more efficient throughput in synchronous counters and sequential circuit applications using flip flop and registers.
- CO 5 Evaluate and develop an understanding the concept ADC, DAC blocks required for data conversion.

**CO-PO-PSO Mapping**

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	1											1		
CO2	2		1											2	
CO3		2											1		
CO4			1											1	
CO5		2	1												2
Average	2	1.6	1										1	1.5	2

**Subject: Data Structures**

**Subject Code: 15CS33**

**Course Outcomes**

- CO 1 Able to understand fundamentals of C language and definition of data structures
- CO 2 Analyse and demonstrate the stacks, queues operations and its applications
- CO 3 Create data storage using linked lists concepts and demonstrate its applications.
- CO 4 Construct trees data structures and perform operations such as traversals, searching and expression evaluation
- CO 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
CO1		2											2		
CO2		2													
CO3					2		2				2				
CO4					2										2
CO5			2				2								
Average		2	2		2		2				2		2	2	

**Subject: Computer Organization****Subject Code: 15CS34****Course Outcomes**

CO-1	Explain the basic organization of a computer system
CO-2	Examine the importance of I/O organization and interrupts in computer system
CO-3	Demonstrate functioning main memory and importance of virtual memory and secondary storage
CO-4	Illustrate hardwired control and micro programmed control. pipelining, embedded and other computing systems
CO-5	Design and analyze simple arithmetic and logical units

**CO-PO-PSO Mapping**

COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	2													2		
CO2	2													2		
CO3	2													2		
CO4	2													2		
CO5		2	2											2		
Average	2	2	2											2		
														2		

**Subject: Unix System Programming****Subject Code: 15CS35****Course Outcomes**

CO-1	Understand multi user unixos and its basic features and variation
CO-2	Interpret unix commands shell basics and shell environments using interpretive manner
CO-3	Design and develop shell programming using filters, communication, system calls and terminologies
CO-4	Design and develop unix file IO unix processes and awk programming
CO-5	Write perl scripts

**CO-PO-PSO Mapping**

COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	3													2		
CO2	3															
CO3			2													
CO4			2													
CO5				1												
Average	3		2	1										2		
														2	2	

**Subject: Discrete Mathematical Structures****Subject Code: 15CS36****Course Outcomes**

CO-1	Verify the correctness of an argument using propositional and predicate logic and truth tables.
CO-2	Demonstrate the ability to solve problems using counting techniques and combinatorics in the context of discrete probability.
CO-3	Solve problems involving recurrence relations and generating functions.
CO-4	Construct proofs using direct proof, proof by contraposition, proof by contradiction, proof by cases, and mathematical induction.
CO-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	
CO1	2															
CO2		2														
CO3	2															
CO4	2	2														
CO5			2													
														2		

Average	2	2	2																2		
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Subject: Analog Digital Electronics Lab													Subject Code: 15CSL37					
Course Outcomes																		
CO-1	Design different types of writing and instruments connections and to evaluate performance characteristics of electronic circuits																	
CO-2	Choose testing and experimental procedures on different types of electronic circuits and analyze their operation different operating conditions																	
CO-3	Identify the overheads in practical experiments simulation results and develop a new design to overcome those problem																	
CO-PO-PSO Mapping																		
COs	POs												PSOs					
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3			
CO1	2	2											1					
CO2			1											2				
CO3			1		1										1			
Average	2	2	1		1								1	2	1			

Subject: Data Structures and application lab													Subject Code: 15CSL38					
Course Outcomes																		
CO1	Design and test of diode circuits																	
CO2	Design and test of oscillator and amplifier, analyze the circuit performance.																	
CO3	Use of universal gates and lcs for code conversion and arithmetic operation.																	
CO-PO-PSO Mapping																		
COs	POs												PSOs					
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3			
CO1		2												2				
CO2			2											2				
CO3		2	2											2				
Average		2	2											2				

**Semester-IV**

Subject: Engineering Mathematics-IV													Subject Code: 15MAT41					
Course Outcomes																		
CO1	Solve first and second ordinary differential equations arising in flow problems using single step and multistep numerical methods.																	
CO2	Solve problems of quantum mechanics employing Bessel's function relating to cylindrical polar coordinate systems and Legendre's polynomials relating to spherical polar coordinate systems																	
CO3	Understand the analyticity, potential fields, residues and poles of complex potentials in field theory and electromagnetic theory Describe conformal and bilinear transformation arising in aerofoil theory fluid flow visualization and image processing																	
CO4	Solve problems on probability distributions relating to digital signal processing, Determine joint probability distributions and stochastic matrix connected with multivariate correlation problems for feasible random events																	
CO5	Draw the validity of the hypothesis proposed for the given sampling distribution in accepting or rejecting the hypothesis, Define transition probability matrix of a Markov chain and solve problems related to discrete parameter random process.																	
CO-PO-PSO Mapping																		
COs	POs												PSOs					
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3			
CO1	3	2																

CO2	3	2														
CO3	3	2														
CO4	3	2														
CO5	3	2														
Average	3	2														

<b>Subject: SOFTWARE ENGINEERING</b>											<b>Subject Code:15CS42</b>					
<b>Course Outcomes</b>																
CO-1	Understand Software Engineering methods, software process models, ethical and professional															
CO-2	Analyze various system models in design and implementation															
CO-3	Evaluate software to verify and validate using various testing methods															
CO-4	Create a quality project plan for software development															
CO-5	Apply advanced software development methods like Agile and Extreme programming for better software development practice															
<b>CO-PO-PSO Mapping</b>																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	2	2														
CO2		2														
CO3		2											2			
CO4			2		2											
CO5					2											
Average	2	2	2		2								2			

<b>Subject: Design and Analysis of Algorithms</b>											<b>Subject Code:15CS43</b>					
<b>Course Outcomes</b>																
CO-1	Understand the basics of algorithm, methods for analyzing algorithm and also expressing the boundaries of efficiencies using asymptotic notations															
CO-2	Describe the method of divide and conquer and when to use such algorithms															
CO-3	Describe dynamic programming paradigm and explain when an algorithm design situation calls for it															
CO-4	Describe Backtracking and branch and bound approaches															
CO-5	Analyze different classes of algorithms such as P,NP and NP hard															
<b>CO-PO-PSO Mapping</b>																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	2	2											1			
CO2	2	2											1			
CO3	2	2											1			
CO4	2	2											1			
CO5	2	2											1			
Average	2	2											1			

<b>Subject: MICROPROCESSOR AND MICROCONTROLLERS</b>											<b>Subject Code:15CS44</b>					
<b>Course Outcomes</b>																
CO-1	Describe the architecture of 8086 and ARM															
CO-2	Illustrate the various addressing modes of 8086 and its operation															
CO-3	Apply the concepts of 8086 in programming															
CO-4	Demonstrate the 8086 Interrupts and its Programming															
CO-5	Explain the concepts of ARM Interfacing and its Application															

CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2												1		
CO2	2	2											1		
CO3		2	3											2	
CO4		2	3											1	
CO5	1	2											1		
Average	1.6	2	3										1	1.5	

Subject: Object Oriented Concepts												Subject Code: 15CS45			
Course Outcomes															
CO-1	Understand the object oriented concepts using C++														
CO-2	Demonstrate the fundamentals of java and working of java development kit														
CO-3	Understand object oriented concepts like class , inheritance, packages and interfaces in java														
CO-4	Interpret exception handling and demonstrate multithreading in java														
CO-5	Develop simple GUI and handling events 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
CO1	2		2										2	2	3
CO2			2		2									2	
CO3			2											2	
CO4			2											2	
CO5			2										2	2	
Average	2		2		2							2	2	2	

Subject: Data Communication												Subject Code: 15CS46			
Course Outcomes															
CO-1	Illustrate basic computer network technology														
CO-2	Identify the different types of network topologies and protocols.														
CO-3	Enumerate the layers of the OSI model and TCP/IP functions of each layer.														
CO-4	Make out the different types of network devices and their functions within a network.														
CO-5	Demonstrate the skills of IEEE Ethernet configurations														
CO-PO-PSO Mapping															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2												1	1	
CO2	2												1		
CO3	2												1		
CO4	2												1		
CO5	2												1		
Average	2												1	1	

Subject: Design and Analysis of Algorithm Lab												Subject Code: 15CSL47			
Course Outcomes															
CO-1	write programs in java to solve Various problems														
CO-2	Implement quick sor, merge sort and Dynamic algorithm														
CO-3	implement Backtracking algorithms for the sum of subset and Hamiltonian cycle, greedy algorithm, for Knapsack prims and kruskals														
CO-PO-PSO Mapping															

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2											1	2	3
CO2	2	2											2		
CO3	2	2											2		
Average	2	2											2	2	

**Subject: Microprocessor and Microcontroller Lab**

**Subject Code: 15CSL48**

**Course Outcomes**

- CO-1 | Percieve the significance of Assembly Language Programming
- CO-2 | Develop application using 8086 Instruction set
- CO-3 | Demostrare the functioning of hardware devices and Interfacing them using 8086 and ARM family

**CO-PO-PSO Mapping**

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2											1	2	3
CO2		2												2	
CO3					3									2	
Average	2	2			3								1	2	

**Semester-V**

**Subject: Management and Entrepreneurship**

**Subject Code: 15CS51**

**Course Outcomes**

- CO-1 | Define the management, organization, enterprenur, planning, staffing, ERP.
- CO-2 | outline the importance of directing leadrship styles, controlling and communication
- CO-3 | Describe the quality and characterstics of enteprenuers.
- CO-4 | Utilize the resources avaiable effectively thrloug ERP..
- CO-5 | use of IPR's and institutional support in entrepreneurship

**CO-PO-PSO Mapping**

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3														
CO2										2					
CO3								3							2
CO4							2								2
CO5												2			2
Average	3						2	3		2		2			2

**Subject: Computer Networks**

**Subject Code: 15CS52**

**Course Outcomes**

- CO-1 | Demonstration of Application layer protocols.
- CO-2 | Recognize transport layer services and infer UDP/TCP protocols.
- CO-3 | Classify routers, IP and Routing algorithms in Network layer.
- CO-4 | Disseminate the wireless and mobile networks covering IEEE 802.11 standard.
- CO-5 | Describe multimedia networking and network management.

**CO-PO-PSO Mapping**

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	1											2		

CO2	2			1										1	
CO3	3			2		3								1	1
CO4	1			1		2							1		1
CO5	1			1		2							1		1
Average	2	1		1.25		2.33							1.33	1	1

**Subject: Database mangement system**

**Subject Code:15CS53**

**Course Outcomes**

- CO-1 Inculcate basic concepts, applications & architecture of Database Management System.
- CO-2 Apply design principles & represent the description of Database using ER diagram and gain knowledge on relational Database theory.
- CO-3 Construct Queries using Relational Algebra expressions and SQL on commercial relational database system(Oracle) and Illustrate to tune the Database design using normalization techniques
- CO-4 Learn basic issues of transaction processing and concurrency control recovery
- CO-5 Design and develop any database application system successfully.

**CO-PO-PSO Mapping**

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3												3		
CO2		2	3	2									2		
CO3		1	2		3	1								3	
CO4	3												3		
CO5		2	2	1	3	1			1		1	3		2	2
Average	3	1.6	2.3	1.5	3	1			1		1	3	2.6	2.5	2

**Subject: Automata Theory and Computability**

**Subject Code:15CS54**

**Course Outcomes**

- CO-1 Demonstrate an in-depth understanding of theories, concepts and techniques in automata and their link to computing.
- CO-2 Compare the different models of Computation like Deterministic, Non deterministic and software models
- CO-3 Describe Grammars and Automata for different language classes and become knowledgeable about restricted models of computation(Regular, Context Free) and their relative powers
- CO-4 Develop skills in formal reasoning and reduction of a problem to a formal model with an emphasis on semantic precision and conciseness
- CO-5 Formulate a problem with respect to different models of Computation

**CO-PO-PSO Mapping**

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3												2		3
CO2			2		3									3	
CO3		2				2						3			
CO4		3													2
CO5				2			3								
Average	3	2.5	2	2	3	2	3					3	2	3	2

**Subject: Advanced Java and J2EE**

**Subject Code:15CS553**

**Course Outcomes**

- CO-1 Interpret the need of advanced java concepts such as enumerations, auto-boxing and annotations.
- CO-2 Understand the working of collection framework and build programs in java
- CO-3 Demonstrate string and link functions and implement the string operations.



CO-4	Build web application using servelets,java server pages and deployment in web server.															
CO-5	Illustrate the database access and manage data using JDBC concepts in java.															
CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	2												2			
CO2		2											2			
CO3		2	2													
CO4					2									2		
CO5			2												2	
Average	2	2	2		2								2	2		
													2	2	2	

<b>Subject: Artificial Intelligence</b>										<b>Subject Code:15CS562</b>						
Course Outcomes																
CO-1	Understand the problem where AI is needed and solving using Heuristic search approaches															
CO-2	Analaysis the Issues in representing the knowledge and deriving the rules to represent the knowledge															
CO-3	Understand and analyse the different AI technique to solve problems															
CO-4	Define learning techniques and compare learning techniques															
CO-5	Discuss on natural language processing and Expert systems															
CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	2												2			
CO2		2		3									2			
CO3		2	2												2	
CO4		2											2	2		
CO5		2	2										2			
Average	2	2	2	3									2			
													2	2		

<b>Subject: DOT NET APPLICATION</b>										<b>Subject Code:15CS564</b>						
Course Outcomes																
CO-1	Create, test and debug Android application by setting up Android development environment.															
CO-2	Implement adaptive, responsive user interfaces that work across a wide range of devices.															
CO-3	Implement adaptive, responsive user interfaces that work across a wide range of devices.															
CO-4	Infer long running tasks and background work in Android applications.															
CO-5	Describe the steps involved in publishing Android application to share with the world.															
CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	2												1			
CO2		2											1			
CO3			2												1	
CO4				2											1	
CO5					2										1	
Average	2	2	2	2	2								1	1		
													1	1		

<b>Subject: Computer Networks Lab</b>										<b>Subject Code:15CSI.57</b>						
Course Outcomes																
CO-1	Analyze and Compare various networking protocols, security and error checking mechanisms.															

CO-2	Demonstrate the working of different concepts of computer networking														
CO-3	Analyze ,implement and evaluate networking protocols 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
CO1		2													
CO2				1											
CO3		2											2		
Average		2		1									2		

<b>Subject: DBA Lab with mini project</b>												<b>Subject Code:15CSL58</b>			
<b>Course Outcomes</b>															
CO-1	Create,update and query on the database														
CO-2	Demonstrate the working of different concepts of DBMS														
CO-3	implement,analyze and evaluate the project developed for an application														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	3	2	2								3		
CO2			3		3									3	
CO3		2	3	2	3	2			2		3	2		2	3
Average	3	2	3	2	2.6	2			2		3	2	3	2.5	3

### Semester-VI

<b>Subject: Cryptography Network Security and Cyber Law</b>												<b>Subject Code:15CS61</b>			
<b>Course Outcomes</b>															
CO-1	Discuss cryptography and its need to various applications														
CO-2	Design and develop simple cryptography algorithms.														
CO-3	Analyze different digital signature algorithm and key management techniques for secure communication														
CO-4	Compare and examine different protocols used in Wireless LAN														
CO-5	Understand cyber security and cyber Law needs.														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2														
CO2			1												
CO3		3												2	
CO4				2										2	
CO5						2		2							
Average	2	3	1	2		2		2					2		

<b>Subject: Computer Graphics &amp;Visualization</b>												<b>Subject Code:15CS62</b>			
<b>Course Outcomes</b>															
CO-1	Explain the Concepts of Computer Graphics and usage of open GL														
CO-2	Illustrate geometric transformation and viewing functions on 2D objects														
CO-3	Demonstrate the concepts of clipping, 3D transformations, color and illumination model														
CO-4	Differentiate various projection and viewing techniques on 3D objects														

CO-5	Demonstrate the use of various API for input interaction to develop GUI														
<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3				2										1
CO2	3	2			2										2
CO3	3														1
CO4	2	2													1
CO5	3				3										1
Average	2.8	2			2.33										1.2

**Subject: System Software and compiler design** **Subject Code: 15CS63**

<b>Course Outcomes</b>	
CO1	Analyze signals and perform various signal processing operations using DFT.
CO2	Explain and Apply FFT algorithms for efficient computation of DFT and IDFT of a given sequence.
CO3	Design of IIR analog and digital filters by using Butterworth and Chebyshev technique.
CO4	Design of IIR digital filters by using impulse invariant technique and bilinear transformation technique.
CO5	Design a digital IIR and FIR filter by using direct, cascade, parallel and linear phase methods of realization.

<b>CO-PO-PSO Mapping</b>															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2														
CO2		2													
CO3															2
CO4				2											
CO5					2										
Average	2	2		2	2										2

**Subject: Operating Systems** **Subject Code: 15CS64**

<b>Course Outcomes</b>	
CO-1	Demonstrate need for Operating System and different types of Operating System.
CO-2	Apply suitable techniques for Management of different resources.
CO-3	Use processor , memory ,storage and file system commands.
CO-4	Define deadlocks situation and solve deadlock scenarios in a operating system.
CO-5	Realize the different concepts of opertaing system 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
CO1	2												2		
CO2		2												2	
CO3		2													
CO4		2													
CO5	2		2												
Average	2	2	2										2	2	

**Subject: Data mining data warehousing** **Subject Code: 1CS651**

<b>Course Outcomes</b>	
CO-1	understand the basic concepts of data mining and datawarehousing

CO-2	Identify datamining Problems and implement the datawarehouse
CO-3	write association rules for a given data pattern
CO-4	describe the classification and clustering techniques
CO-5	choose between classification and clustering sloution for a given problem

**CO-PO-PSO Mapping**

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3												2		
CO2		2													
CO3			3											2	
CO4				2											
CO5					2										2
Average	3	2	3	2	2								2	2	2

<b>Subject: MOBILE APPLICATION DEVELOPMENT</b>	<b>Subject Code:15CS661</b>
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**Course Outcomes**

CO-1	Create, test and debug Android application by setting up Android development environment.
CO-2	Implement adaptive, responsive user interfaces that work across a wide range of devices.
CO-3	Implement adaptive, responsive user interfaces that work across a wide range of devices.
CO-4	Infer long running tasks and background work in Android applications.
CO-5	Describe the steps involved in publishing Android application to share with the world.

**CO-PO-PSO Mapping**

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1			2										1		
CO2			2	2									1		
CO3				2									1		
CO4					2								1		
CO5					2							1	1		2
Average			2	2	2							1	1		2

<b>Subject: PYTHON APPLICATION PROGRAMMING</b>	<b>Subject Code:15CS664</b>
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**Course Outcomes**

CO-1	Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
CO-2	Demonstrate proficiency in handling Strings and File Systems.
CO-3	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
CO-4	Interpret the concepts of Object-Oriented Programming as used in Python.
CO-5	Implement exemplary applications related to Network Programming, Web Services and Databases in Python.

**CO-PO-PSO Mapping**

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1		2	2												
CO2				2											
CO3				2	2										
CO4													2		
CO5						2							2		
Average		2	2	2	2	2							2		

**Course Outcomes**

CO-1	Implement and demonstrate lexers and parsers
CO-2	Implement and demonstrate top down, bottom up parsing and generation of intermediate code.
CO-3	Implement different algorithms required for memory management, process scheduling, resource allocation used in operating system

**CO-PO-PSO Mapping**

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1					3										
CO2				3									2		
CO3			3	3											
Average			3	3	3								2		

**Course Outcomes**

CO-1	Illustrate the concepts of computer graphics and implement computer graphics application using open GL
CO-2	Develop and execute polygon filling, clipping, algorithms and animate curves using openGL
CO-3	Design and implement basic transformation and viewing functions on objects using opengl for 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
CO1	3														2
CO2			2												1
CO3			3						3		2	2			2
Average	3		2.5						3		2	2			1.66

**Semester-VII**

**Course Outcomes**

CO-1	Understand and Adapt HTML and CSS syntax and semantics to build web page
CO-2	Construct and visually format tables and forms using HTML and CSS
CO-3	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.
CO-4	Appraise the principles of object oriented development using PHP
CO-5	Inspect JavaScript frameworks like j Query and Backbone which facilitates developer to focus on core features.

**CO-PO-PSO Mapping**

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2											2	2	
CO2	2	2	2										2	2	
CO3	2	2	2										2	2	
CO4	2	2											2		
CO5	2	2	2												
Average	2.2	2	2									2	2	2	2

## Course Outcomes

CO-1	Explain the concepts of parallel computing and network technologies
CO-2	Analyze the performance with respect to Power & cost.
CO-3	Illustrate parallel algorithm for parallel architecture.
CO-4	Understand the design issues relating to memory hierarchy and architecture.
CO-5	Understand the programming concepts in context of computer system design & organization.

## CO-PO-PSO Mapping

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	1											2		
CO2	2	1											1		
CO3	2	1	1										1		
CO4	3	1											1	1	
CO5	2	1										1	1		1
Average	2.4	1	1									1	1.2	1	1

## Course Outcomes

CO-1	Understand the basic concepts of Machine learning and its types
CO-2	Identify optimal techniques suitable for a given problem
CO-3	Illustrate learning algorithms
CO-4	Apply machine learning technique towards real world data analysis
CO-5	Design an application using machine learning methods

## CO-PO-PSO Mapping

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3										1	2		2
CO2		2			2								2	2	
CO3	2												1		
CO4	2	2				2						2	2		1
CO5			3	1								1	1		2
Average	2.33	2.33	3	1	2	2						1.33	1.6	2	1.66

## Course Outcomes

CO-1	Review the unix kernel structure and system call
CO-2	Apply unix APIs to demonstrate the working of the file system
CO-3	Make use of various APIs to create, handle and control the processes in unix environment
CO-4	Analyze unix kernel support for signals and daemon processes..
CO-5	Interpret the different mechanisms for interprocess communication.

## CO-PO-PSO Mapping

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	1											2		
CO2	2	2	1										2	2	
CO3	2	2												2	
CO4	2	2												2	
CO5	2	2	2										2		
Average	2.2	1.8	1.5										2	2	

**Course Outcomes**

CO-1	Identify key challenges in managing information along with RAID implementations.
CO-2	Describe different storage networking technologies and virtualization.
CO-3	Illustrate backup, archive and replication. Explain components and the implementations of NAS.
CO-4	Determining different cloud computing deployment models, service models and infrastructure components.
CO-5	Illustrate the storage infrastructure and management activities.

**CO-PO-PSO Mapping**

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2											2		
CO2	1	2	2									1			
CO3	2												2		2
CO4	2		2		1	1							1	1	2
CO5	1	2										2			2
<b>Average</b>	1.8	2	2		1	1						1.5	1.66	1	2

**Course Outcomes**

CO-1	Explore various python libraries useful for real-time application and choose appropriate data sets to the Machine Learning algorithms.
CO-2	Understand the implementation procedures for the machine learning algorithms
CO-3	Identify and apply Machine Learning algorithms 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
CO1	2	2	2										2		
CO2					2	1							2		
CO3	1	2	2									2	2	2	2
<b>Average</b>	1.5	2	2		2	1						2	2	2	2

**Course Outcomes**

CO-1	Understand and Adapt HTML and CSS syntax and semantics to Design and develop dynamic web pages with good aesthetic sense
CO-2	understanding of Web Application Terminologies, Internet Tools other web services
CO-3	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically. Learn how to link and publish web sites

**CO-PO-PSO Mapping**

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	2										2	2	
CO2	2	2	2		2								2	2	
CO3	2	2	2	2	2	1			2	2	2	2	2	2	2
<b>Average</b>	2.33	2.33	2	2	2	1			2	2	2	2	2	2	2

**Course Outcomes**

CO-1	Gain knowledge on societal real time problems and identify innovation required
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CO-2	Undertake identified problems statement in different domains
CO-3	Analyse the problem statement through literature survey
CO-4	Formulation of designing Process
CO-5	Knowing the functionality of team work / Individuals

**CO-PO-PSO Mapping**

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2											2	2		
CO2		2										1			
CO3		3										2	1		
CO4			1								2			1	
CO5									3			2			
Average	2	2.5	1						3		2	1.75	1.5	1	

**Semester-VIII**

<b>Subject: Internet of Things &amp; Application</b>	<b>Subject Code:15CS81</b>
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**Course Outcomes**

CO-1	Interpret the impact and Challenges posed by IoT networks leading to new Architectural models
CO-2	Compare and Contrast the depoloyment of smart objects and the technologies to connect them to network
CO-3	Apprasie the role of IoT protocols for efficient network communication
CO-4	Eloborate the need of Data Analytics and its security in IoT
CO-5	Illustrate different sensor technologies for sensing real worl entities and identify the applications of lot in Industry

**CO-PO-PSO Mapping**

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3												1		
CO2	2	2											2		
CO3	2	2											1		
CO4		1				2							1		
CO5	2	2											2	1	
Average	2.25	1.75				2							1.4	1	

<b>Subject: Big Data Analytics</b>	<b>Subject Code:15CS82</b>
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**Course Outcomes**

CO-1	Understand the concepts of HDFS and map reduce framework
CO-2	Investigate hadoop related tools for Big data Analytics and perform basic hadoop administration.
CO-3	Recognize the role of business Intelligence, data ware housing and visualization in decision making.
CO-4	Infer the importance of core data mining techniques for data analytics.
CO-5	Compare and contrast different text mining web mining, naïve bayes analysis, support vector machines and social network analysis.

**CO-PO-PSO Mapping**

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2											2		1
CO2	2	2			1								2	2	3
CO3	2										1		2		2
CO4	2	2	2			2							2		3



CO5	3	2	2										1	2		2
Average	2.4	2	2		1	2							1	2	2	2.2

<b>Subject: System Modelling And Simulation</b>												<b>Subject Code: 15CS834</b>				
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Course Outcomes																
CO-1	Identify the role of important elements of discrete even simulation and modeling paradigm in real world															
CO-2	Describe the various distribution models and analyze various queuing models															
CO-3	Examine and apply techniques for generating random numbers and random variants.															
CO-4	Judge appropriate method for data collection and testing methods															
CO-5	Sketch the model and apply the results to solve critical issues in a real world environment															

CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	3	2										2	2		3	
CO2	1	2		2							2			2		
CO3					1									3		
CO4			2				3						1			
CO5			3	2							3			2		
Average	2	2	2.5	2	1		3				2.5	2	1.5	2.33	3	

<b>Subject: Internship</b>												<b>Subject Code: 15CS84</b>				
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Course Outcomes																
CO-1	Identify and apply the problem using engineering knowledge															
CO-2	Design and implement new concepts in multidisciplinary area.															
CO-3	Explore career alternatives prior to graduation in different domains															
CO-4	Demonstrate professional and ethical practice															
CO-5	Gain more experience in accomplishing a long-term project, and managing the progress continuously.															

CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	3	2											2	1		
CO2			3						2	2				1	2	
CO3		1	1						2			2			3	
CO4			2					2						2		
CO5											2	2			2	
Average	3	1.5	2					2	2	2	2	2	2	1.33	2.33	

<b>Subject: Project Work Phase II</b>												<b>Subject Code: 15CSP85</b>				
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Course Outcomes																
CO-1	Design engineering solution to complex problems utilizing a system approach using modern tools															
CO-2	Communicate with peers, supervisor engineers and society															
CO-3	Implement the innovative designed work and conduct performance analysis using engineering project principles.															
CO-4	Demonstrate the work done and knowledge gained in completed work															
CO-5	Demonstrated work presented in terms of Dissertation and / or Publications															

CO-PO-PSO Mapping																
COs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1			3		3	2						2	3	3	2	
CO2								2	3	3		2		2	2	

CO3		3		3							3	2	3	3	2	
CO4							2		2	2	3	2		2	2	
CO5								2	2	3	2	2			2	
Average		3	3	3	3	2	2	2	2	2.33	2.66	2.66	2	3	2.5	2


<b>Subject: Seminar</b>	<b>Subject Code:15CSS86</b>
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**Course Outcomes**

CO-1	Identify and Analyze information about emerging technologies with respect to current trends.
CO-2	Identify promising new directions of various cutting edge technologies with intrapersonal skills.
CO-3	Communicate effectively to a diverse audience, exhibit effective communication skills.
CO-4	Students should discuss appropriate modern engineering and IT Tools in new innovations and inventions.
CO-5	Explain various techniques and skills used for preparing detailed report along with results.

**CO-PO-PSO Mapping**

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2											2		
CO2	2	2											1		
CO3	2	2							2	3			2		
CO4	2	2			1								2		
CO5	2	2				1	2						2		
Average	2	2			1	1	2		2	3			1.8		

  
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