Name of the Programme : B.Tech IT (2019-23)

CO-PO mapping of the Courses

Semester	Catalog	Course Title	Course	CO List	PO 1	PO 2 Problem	PO 3 Design/	PO 4 Conduct	PO 5 Modern	PO 6 The	PO 7	PO 8 Ethics	PO 9	PO 10	PO 11 Project	PO 12 Life-	PO 13 Use of	PO 14 Create	PSO 1 Engg	PSO 2 Cutting
I	70124101	Engineering Mathematics -I	CO1	Apply successive differentiation to find nth	3	1	-	-	-	-	-	-	3	-	-	2				
			CO2	Apply the concepts of partial differentiations to	3	2	-	-	-	-	-	-	3	-	-	2				
			CO3	Evaluate integrals using reduction formulae and	3	2	-	-	-	-	-	-	3	-	-	2				
			CO4	Test the convergence of series of positive terms,	3	3	-	-	-	-	-	-	3	-	-	2				
			CO5	Evaluate rank of a matrix, Eigen values and Eigen vectors. Find inverse using Caley Hamilton theorem and solve system of simultaneous equations.	3	2	-	-	-	-	-	-	3	-	-	2				
I	70124102	Physics	CO1	Understand the origin and nature of electric field and electric lines of force and calculate the flux through various surfaces.	2	2	1	-	1	-	-	-	1	-	-	1	-	1		
			CO2	Explain the electric properties of various	1	1	1	-	1	-	-	-	1	-	-	2	-	1		
			CO3	Understand the origin and nature of magnetic	2	2	1	-	1	-	-	-	1	-	-	1	-	1		
			CO4	Explain the behaviour of various materials in magnetic field and nature of magnetic media.	1	1	1	-	1	-	-	-	1	-	-	2	-	1		
			CO5	correlate the relation between electric and magnetic fields and understand and interpret the Maxwell's equations	1	1	1	-	1	-	-	-	1	-	-	2	-	3		
I	70124103	Physics Lab	CO1	Enhancing the problem analyzing aptitude by																
			CO2	Data analysis, interpretation and drawing																
			CO3	Promoting individual and team work skills																
			CO4	Inculcating ethics while recording (true)																
			CO5	Teaching project management by learning to																
I	70124104	Environmental Science	CO1	Understand about sustainable technologies for res	3	1	1	-	-	2	3	1	1	-	-	2	1	1		
			CO2	Identify sources, effects and remedial measures fo	1	-	-	-	-	1	1	-	1	-	-	1	2			
			CO3	Identify and formalize a generalized water and wa	2	2	1	2	1	3	3	-	-	-	-	2	3	3		
			CO4	Identify various sources of solid wastes, their effe	3	1	1	2	2	2	3	-	-	-	-	-	3	3		
			CO5	Know about existing environmental laws and legis	2	1	-	1	-	2	2	-	-	1	-	1	-	-		
I	70124105	Creative Thinking	CO1																	
			CO2																	
			CO3																	
			CO4																	
			CO5																	
I	70124106	Programing in C	CO1	Understand the basic concepts of C	2	2	2	2	2	1	-	-	-	-	-	2	2	2		
			CO2	Illustrate the C data types, syntax and constructs.	2	2	2	2	2	1	-	-	-	-	-	2	2	2		
			CO3	Illustrate C for decision making, branching and	2	2	2	2	2	1	-	-	-	-	-	2	2	2		
			CO4	Understand the concept of Array and Strings to	2	2	2	2	2	1	-	-	-	-	-	2	2	2		
			CO5	Apply the concepts of Function modules, its	2	2	2	2	2	1	-	-	-	-	-	2	2	2		
			CO6	Understand the concepts of structures and	2	2	2	2	2	1	-	1	1	1	-	2	2	2		
I	70124107	Programing in C Lab	CO1	Understand the programming in IDE (Integrated	1	1	2	2	1	2	-	-	1	1	-	2	2	2		
			CO2	Interpret the programming tasks logically and	2	1	2	2	1	2	-	-	1	1	-	2	2	2	2	-
			CO3	Design and implement basic programming	2	2	2	2	1	2	-	-	1	1	-	2	2	2	2	-
			CO4	Understand and apply the concept of Array and	2	2	2	2	2	2	-	-	1	1	-	2	2	2	3	-
			CO5	Understand the concepts of Function modules, its	2	2	2	2	2	2	-	-	1	1	-	2	2	2	3	-
			CO6	Understand and apply the concepts of structures	2	2	2	2	2	2	-	-	1	1	-	2	2	2	3	-
II	70124108	Tinker Lab	CO1	Relate fundamental concepts/laws of science and	2	1	-	-	-	-	-	-	3	1	-	1	1	-	2	-
			CO2	Practice pre-achieved skills on hardware and devi	1	-	-	-	-	-	-	-	1	1	-	1	1	-	3	-
			CO3	Take apart and reassemble and/or repairing of eng	1	-	-	-	-	-	-	1	1	-	-	1	-	-	3	-
			CO4	Explore various aspects of tinkered devices/instru	1	-	-	-	-	-	-	-	2	-	-	2	-	-	3	-
			CO5	Design and make models out of creativity using ra	1	-	-	1	-	-	-	-	3	2	-	-	-	-	3	-
II	70124109	Communication Skills	CO1	Communicate/ express effectively in corresponder	-	-	-	-	-	-	-	2	3	3	-	3	-	-	3	-
			CO2	Identify/ Recognize the barriers to effective	-	-	-	-	-	-	-	2	3	3	-	3	-	-	2	-
			CO3	Employ etiquettes and effective communication in	-	-	-	-	-	-	-	2	1	3	-	2	-	-		
			CO4	Compose or create formal reports, memos, agenda	-	-	-	-	-	-	-	2	1	3	-	3	-	-		
			CO5	Create and deliver effective presentations.	-	-	-	-	-	-	-	-	2	3	-	2	-	-		
II	70124110	Communication Skill Lab	CO1	Express ideas and concepts well through vocabula	-	-	-	-	-	-	-	-	2	2	1	1	-	-		
			CO2	Demonstrate linguistic competence- through accu	-	-	-	-	-	-	-	-	2	2	1	1	-	-		
			CO3	Employ etiquettes in oral and written communicat	-	-	-	-	-	-	-	-	3	3	1	1	-	-		
			CO4	Modify their listening skills.	-	-	-	-	-	-	-	-	2	2	1	1	-	-		
			CO5	Sketch their articulation while participating in Gr	-	-	-	-	-	-	-	-	2	2	1	1	-	-		
II	70124201	Engineering Mathematics -II	CO1	Evaluate multiple integral in different coordinate	3	2	-	-	-	-	-	-	3	-	-	2				
			CO2	Apply multiple integralto find area, volume and	3	2	1	-	-	-	-	-	3	-	-	2				
			CO3	Identify and solve linear differential equations	3	3	-	-	-	-	-	-	3	-	-	2				
			CO4	Evaluate gradient, divergence, curl, directional	3	2	-	-	-	-	-	-	3	-	-	2				
			CO5	Evaluate Laplace transform of various function	3	2	1	-	-	-	-	-	3	-	-	2				
II	70124202	Chemistry	CO1	understand different terms and numericals	3	2	-	-	-	-	-	-	-	-	-	-	-	-		
			CO2	understand the basic concept in polymer	3	-	-	-	-	-	-	-	-	-	-	-	-	-		
			CO3	apply the concepts related to various spectroscopi	3	-	-	-	-	-	-	-	-	-	-	-	-	-		
			CO4	describe different thermodynamic concepts and	3	2	-	-	-	-	-	-	-	-	-	-	-	-		
			CO5	understand the basic concepts related to Green	3	-	-	-	-	-	-	-	-	-	-	-	-	-		
			CO6	describe the concepts related to fuel chemistry,	3	-	-	-	-	-	-	-	-	-	-	-	-	-		
II	70124203	Chemistry Lab	CO1	examine water samples for different parameters th	3	3	2	2	-	1	-	-	2	-	-	-	-			
			CO2	understand the preparation of condensation polyn	3	2	-	-	-	-	-	-	1	-	-	-	-			
			CO3	understand basic experimentation related to adsor	3	-	-	-	-	-	-	-	1	-	-	-	-			
			CO4	apply basic concepts in spectroscopic analysis	3	1	-	-	-	-	-	-	1	-	-	-	-			
			CO5	write effectively the results of experimentation and	-	1	-	-	-	-	-	-	1	-	-	-	-			
II	70124204	Basic Electrical and Electronics Engineering	CO1	Apply the knowledge of relevant laws and	3	3	-	-	-	-	-	-	-	-	-	-	-	-		
			CO2	Develop a clear understanding and acquire the	3	3	-	-	-	-	-	-	-	-	-	-	-	-		
			CO3	Understand basics of semiconductor physics, dioc	3	3	-	-	-	-	-	-	-	-	-	-	-	-		
			CO4	Develop a clear understanding of digital circuits li	3	3	-	-	-	-	-	-	-	-	-	-	-	-		
II	70124205	Basic Electrical and Electronics Engineering Lab	CO1	Understand the need of various safety	2	1	-	-	3	-	-	-	3	1	-	1		1		
			CO2	Apply the knowledge of relevant laws and	3	3	-	-	3	-	-	-	3	1	-	1		1		
			CO3	Develop a clear understanding of the	3	3	-	-	3	-	-	-	3	1	-	1		1		
			CO4	Use and understand different controls of equipme	2	2	-	-	3	-	-	-	3	1	-	1		1		
II	70124206	Programming and Problem solving	CO1	Understand and develop Computational	2	1	1	1	-	-	-	-	-	-	-	-	-	-		
			CO2	Understand the programming in IDE (Integrated	1	1	2	1	2	-	-	-	3	-	-	-	-	-		
			CO3	Understand basic Python Programming,	1	1	2	1	2	-	-	-	3	-	-	-	-	-		
			CO4	Understand and apply object oriented	1	2	2	1	2	-	-	-	3	-	-	-	-	-		

II	70124207	Programming and Problem Solving Lab	CO1	Understand and develop Computational	2	2	2	2	2	-	-	-	-	-	-	2	2	2		
			CO2	Express a problem-solving strategy to breakdown	2	3	3	2	2	-	-	-	-	-	-	2	2	2		
			CO3	Describe python programs that appropriately	2	2	2	2	2	-	-	-	-	-	-	2	2	2		
			CO4	Use functions for structuring Python programs.	2	2	2	2	2	-	-	-	-	-	-	2	2	2		
			CO5	Represent compound data using Python lists,	2	2	2	2	2	-	-	-	-	-	-	2	2	2		
			CO6	Understand and apply object oriented	2	2	2	2	2	-	-	-	-	-	-	2	2	2		
III	70124208	Critical Thinking	CO1																	
			CO2																	
			CO3																	
			CO4																	
			CO5																1	1
III	70124209	Engineering Graphics	CO1	Understand and draw projections of points (0D) l	3														1	1
			CO2	Visualize, plan and draw projections of lines	3	1													1	1
			CO3	Visualize and draw projections of regular solids	3	2													1	1
			CO4	Visualize and communicate 3D regular/irregular	3	1													1	1
III	70124210	Software Tools	CO1	Create formula with absolute and realtive cell	3	3	2	2	2	-	-	-	-	-	-	1	-	-	1	1
			CO2	Understand the functioning of various MS-Excel	3	3	3	2	-	-	-	-	-	-	-	1	-	-	1	1
			CO3	Demonstrate the ability to use PowerPoint and	3	3	2	1	-	-	-	-	3	2	-	1	-	-		
			CO4	Analyze the data by using statistical fuctions	3	3	3	2	2	-	-	-	-	-	-	1	-	-		
			CO5	Create microsoft outlook profiles to configure it	3	3	2	1	3	-	-	-	-	-	-	1	-	-		
III	70124303	Programming Paradigms	CO1	Discuss various types of programming languages	2	1	1	1	1	-	-	-	-	-	-	2	1	-	2	1
			CO2	Illustrate procedural programming concepts like	2	1	2	1	1	-	-	-	-	-	-	2	1	-	-	1
			CO3	Explain object oriented programming concepts	2	2	2	2	1	-	-	-	-	-	-	2	2	-	3	-
			CO4	Express the concept of polymorphism,	3	3	3	3	2	--	-	-	2	-	-	2	2	-	-	2
			CO5	Discuss basic concepts of Python, decision	3	3	3	3	3	-	-	-	2	-	-	2	2	-	2	2
			CO6	Infer the concepts of logic programming	2	3	2	2	2	-	-	-	-	-	-	2	2	-	2	2
III	70124309	Programming Paradigms Lab	CO1	Express problem-solving strategy to breakdown a	3	2	2	2	2	-	-	-	-	-	-	2	2	-	2	2
			CO2	Demonstrate the concepts of classes, objects and	2	2	2	2	2	-	-	-	-	-	-	2	2	-	2	2
			CO3	Express C++ programs that appropriately utilize	2	3	3	3	2	-	-	-	-	-	-	2	2	-	2	2
			CO4	Demonstrate how to achieve reusability using	2	2	3	3	2	-	-	-	-	-	-	2	2	-	2	2
			CO5	Indicate facts and rules through prolog programs	2	2	3	2	2	-	-	-	-	-	-	2	2	-	2	2
			CO6	Express python programs that appropriately	2	2	3	2	2	-	-	-	-	-	-	2	2	-	2	2
III	70124302	Fundamentals of Data Structures	CO1	Demonstrate fundamental concepts & constructs	3	2	3	1	1	1	1	1	2	1	1	1	1		1	2
			CO2	Demonstrate a thorough understanding of	2	3	2	2	1	1	1	1	2	1	1	1	1		1	2
			CO3	Compare different types of queue data structure	3	3	2	1	1	1	1	1	1	1	1	1	1		1	2
			CO4	Demonstrate stack data structure and its	3	3	2	1	1	1	1	1	1	1	1	1	1		1	2
			CO5	Identify different file modes and operations.	2	2	1	1	1	1	1	1	1	1	1	1	1		1	2
III	70124310	Fundamentals of Data Structures Lab	CO1	Implement fundamental concepts & constructs of C language.	3	2	3	1	2	1	1	1	2	1	1	1	1		1	-
			CO2	Implement different searching techniques.	2	3	2	2	2	1	1	1	2	1	1	1	1		1	-
			CO3	Implement different sorting techniques.	3	3	2	2	2	1	1	1	1	1	1	1	1		1	-
			CO4	Demonstrate / implement different types of queue	3	3	2	2	2	1	1	1	1	1	1	1	1		1	-
			CO5	Implement / demonstrate stack data structure and	2	2	1	1	1	1	1	1	1	1	1	1	1		1	-
			CO6	Identify different file modes and operations.	2	2	1	1	1	1	1	1	1	1	1	1	1		1	-
III	70124304	Computer Organization	CO1	Understand computer evolution, components,	3	1	3	1	1	1	1	1	1	1	1	1	1			
			CO2	Summarize machine instructions, organization of	1	3	1	1	1	1	1	1	1	1	1	1	1			
			CO3	Outline the hardwired control unit design	3	1	3	1	1	1	1	1	1	1	1	1	1			
			CO4	Distinguish between different types of memories;	3	3	3	1	1	1	1	1	1	1	1	1	1			
			CO5	Interpret the Input / Output transfer techniques	3	3	1	1	1	1	1	1	1	1	1	1	1			
IV	70124305	Digital Electronics and Logic Design	CO1	Convert a number from one number system to	3	3	1	1	1	1	1	1	1	1	1	1	1			
			CO2	Study different types of logic gates and	3	3	1	1	1	1	1	1	1	1	1	1	1			
			CO3	Reduce Boolean expression to the minimum	2	3	2	1	1	1	1	1	1	1	1	1	1			
			CO4	Design combinational circuits such as half adder,	3	3	3	1	1	1	1	1	1	1	1	1	1			
			CO5	Explain the concept of synchronous and	3	3	3	1	1	1	1	1	1	1	1	1	1			
IV	70124307	Digital Electronics and Logic Design Lab	CO1	Construct various gates using universal gates.	3	3	1	1	1	1	1	1	1	1	1	1	1			
			CO2	Build a full adder using half adder	3	3	1	1	1	1	1	1	1	1	1	1	1		2	2
			CO3	Build a full subtarctor using half adder.	2	3	2	1	1	1	1	1	1	1	1	1	1		2	2
			CO4	Perform BCD addition and design BCD adder.	3	3	3	1	1	1	1	1	1	1	1	1	1		2	2
			CO5	Design and implement a binary to Gray code	3	3	3	1	1	1	1	1	1	1	1	1	1		2	2
			CO6	Design and implement a gray code to binary	3	3	1	1	1	1	1	1	1	1	1	1	1		2	2
			CO7	Design combinational circuit such as magnitude	3	3	1	1	1	1	1	1	1	1	1	1	1		2	2
			CO8	Implement Sum of Products/Product of Sum	2	3	2	1	1	1	1	1	1	1	1	1	1		2	2
			CO9	Design demultiplexer using logic gates.	3	3	3	1	1	1	1	1	1	1	1	1	1		2	2
			CO10	Design sequential circuits.	3	3	3	1	1	1	1	1	1	1	1	1	1		2	2
IV	70124403	Operating Systems	CO1	Demonstrate the understanding of fundamental															2	2
			CO2	Understand the concept of process and thread	3	1	2	-	-	-	-	-	1	1	-				2	2
			CO3	Explain and apply the concept of process	3	3	2	3	-	-	-	-	1	1	-	1				
			CO4	Discuss various memory management techniques and apply memory page replacement	-	3	2	2	-	-	-	-	2	1	-	1			2	2
			CO5	Understanding of the concepts of file	1	3	2	2	-	-	-	-	2	1	-	1			2	2
			CO6	Discuss the management ofI/O devices by	2	2	2	-	-	-	-	-			-	1			2	2
V	70124402	Data Structures	CO1	Use the concepts of sequential, simple index file	2	2	2	2	-	-	-	-	1	1	-	1			2	2
			CO2	Design and implement abstract data types such as linked list, stack, queue and tree by using C as	3	3	2	1	1	1	1	1	1	1	1	1			2	2
			CO3	Analyze, evaluate and choose appropriate	3	3	2	1	1	1	1	1	1	1	1	1			2	2
			CO4	Illustrate the concepts of graph to solve problems	2	2	1	1	1	1	1	1	1	1	1	1			2	2
			CO5	Classify and compute minimum cost spanning	2	2	1	1	1	1	1	1	1	1	1	1			2	2
			CO6	Describe the applications for a dictionary/map	3	2	3	1	2	1	1	1	2	1	1	1				
V	70124406	Data Structures Lab	CO1	Analyse the concepts of sequential, simple index	2	3	2	2	2	1	1	1	2	1	1	1			3	2
			CO2	Demonstrate linked list concepts such as internal	3	3	2	2	2	1	1	1	1	1	1	1			3	2
			CO3	Implementation of stack and queues using linked	3	3	2	2	2	1	1	1	1	1	1	1			3	2
			CO4	Development of Mini project	3	3	3	2	2	1	1	1	1	1	1	1			3	2
V	70124407	Operating Systems Lab	CO1	Discuss the basics of Linux commands and	3	2										1	1		3	2
			CO2	Explain different Linux Shell commands and	2	3	2		2							1	1		3	2
			CO3	Relate file operations of Linux to the basic	2	3	2		2							1	1		3	3
			CO4	Understand various arithmetic commands on	1	3	3		2							1	1		3	3
			CO5	Interpret various looping, conditional statements	1	3	3		2							1	1		3	3
			CO6	Estimateand compare Waiting/Turnaround time	1	3	3									1			3	3
			CO7	Discuss how deadlocks can be detected using	1	3	3						1	1		1			3	3
			CO8	Compare memory allocation of processes by	1	3	3						1	1		1			3	3
V	70124505	Theory of Computation	CO1	Illustrate automata theory, its types and inter	2	2	3	1	1	1	1	1	1	1	1	1	1			
			CO2	Identify Regular Expressions (RE) and Regular	2	2	3	2	1	1	1	1	1	1	1	1	1		1	1
			CO3	Analyze Context Free Grammar (CFG), different	2	2	3	1	1	1	1	1	1	1	1	1	1		1	1
			CO4	Relate Push Down Automata (PDA) to Context	2	2	3	1	1	1	1	1	1	1	1	1	1		1	1

			CO5	Identify Turing Machine and calculate	2	2	3	2	1	1	1	1	1	1	1	1	1		1	1
V	70124504	Data Base Management Systems	CO1	Demonstrate an understanding of basic database	3	3	2						1			1			1	1
			CO2	Construct solutions to a broad range of query	1	3	3	3					1	1		1			1	1
			CO3	Show an understanding of database design	1	3	3	3					1	1		1			1	1
			CO4	Determine various database organization	1	3	3	3					1	1		1			1	1
			CO5	Examine the working of transaction management	1	3	3	3					1	1		1			2	2
			CO6	Illustrate the need and distinguishing factors	1	3	3	3					1	1		1			2	2
V	70124506	Data Base Management Systems Lab	CO1	Design a database schema for a given problem-domain	2	2	3	2	1				1			1		2	2	1
			CO2	Be familiarized with a query language	2	2	3	2	2				1			1	2		2	1
			CO3	Implement the database schema using SQL	2	2	3	2	2				1			1	2		2	1
			CO4	Illustrate the ability to extract the knowledge	2	2	3	2	2				1			1	2		2	1
			CO5	Compare the performance of PL/SQL functions,	2	2	3	2	2				1			1	2		2	1
V	70124503	Computer Networks	CO1	Learn and explore the basics of networking.	3	3	3	1	1	1	1	1	1	1	1	1	1	-	2	2
			CO2	Demonstrate understanding on Socket	3	3	3	1	1	1	1	1	1	1	1	1	1	-		
			CO3	Demonstrate deeper understanding on reliable	2	2	3	1	3	1	3	3	1	1	1	1	1	-		
			CO4	Develop clear understanding on routing and	2	2	3	1	3	1	3	3	1	1	1	1	1	-		
			CO5	Explore error detection and error correction	1	1	1	1	1	1	1	1	1	1	1	1	1	-		
V	70124508	Computer Networks Lab	CO1	Understand basics of networking devices.	1	1	1	1	1	1	1	1	1	1	1	1	1	-	2	1
			CO2	Analyze an ARP, ICMP AND HTTP packet by	1	3	3	1	3	1	3	1	1	1	1	1	1	-	2	1
			CO3	Implement Socket programming using any	1	3	3	1	3	1	3	1	1	1	1	1	1	-	2	1
			CO4	Analyze DNS packet by using Wireshark tool.	1	3	3	1	3	1	3	1	1	1	1	1	1	-	2	1
			CO5	Simulate Sliding Window Protocol and traffic	1	3	3	1	3	1	3	1	1	1	1	1	1	-	2	1
			CO6	Implement Distance Vector routing algorithm	1	3	3	1	3	1	3	1	1	1	1	1	1	-	2	1
V	70124527	JAVA	CO1	Demonstrate object oriented concepts such as	2	1	1	1	1	-	-	-	-	1	1	1	1	-	1	2
			CO2	Demonstrates how to achieve reusability using	1	2	2	1	1	-	-	-	1	-	-	1	1	-	1	2
			CO3	Demonstrate understanding and use of different	1	2	3	1	1	-	-	-	1	-	-	1	1	-	1	2
			CO4	Practice the concept of event handling in AWT	1	2	2	1	1	-	-	-	1	-	-	1	1	-	1	2
			CO5	Sketch the lifecycle of an applet in Java.	1	2	2		1	-	-	-	1	-	-	1	1	-	1	2
			CO6	Demonstrate the usage of basic Java language	1	2	2	2	2	-	-	-	2	-	-	1	1	-	1	2
V	70124528	Introduction to Data Science	CO1	Introduction to major concepts in data science.	2	-	1	-	2	1	-	2	1	-	-	1	-	-	1	1
			CO2	Use of R language to carry out basic statistical	3	3	3	3	3	3	-	2	2	1	-	-	-		1	2
			CO3	To understand the significance of exploratory	2	2	3	2	3	-	-	1	2	-	-	-	-		1	2
			CO4	Apply basic machine learning algorithms for	3	3	3	2	2	-	-	2	2	-	-	-	-			
			CO5	To createeffective visualization of given data.	1	2	2	2	2	-	-	1	-	-	1	-	-		1	2
			CO6	Understanding ethical and privacy issues in data	2	1	2	2	3	1	-	3	3	1	3		-		1	2
V	70124529	Introduction to AI and Machine Learning	CO1	Explain definition, goals and applications of	2	2	2	1	3	-	-	-	-	-	-	-	3	-	1	2
			CO2	Illustrate various properties of Internal	2	2	2	1	3	-	-	-	-	-	-	-	3	-	1	2
			CO3	Evaluate solving problems in AI by various	2	3	2	2	3	-	-	-	-	-	-	-	3	-	1	2
			CO4	Illustrate various knowledge representations	2	3	2	1	3	-	-	-	-	-	-	-	3	-	2	2
			CO5	Analyze and apply various AI techniques to real	2	2	2	2	3	-	-	-	-	-	-	-	3	-	2	2
			CO6	ApplyNatural Language Processing	2	2	2	2	3	-	-	-	-	--	-	-	3	-	2	2
			CO7	Outline and organizearchitecture of Expert	2	2	2	1	3	-	-	-	-	-	-	-	3	-	2	2
			CO8	Illustrate various learning techniques including	2	2	2	1	3	-	-	-	-	-	-	-	3	-	2	2
V	70124514	R Programming	CO1	Identify and use of R software for scientific	1	2	1	2	2	-	-	-	-	-	-	-	2	1	2	2
			CO2	Develop efficient programs using R to perform	1	2	1	2	2	-	-	-	-	-	-	-	2	1		
			CO3	Experiment with Statistical analysis of data and	2	2	1	2	2	-	-	-	-	-	-	-	2	1	2	2
			CO4	Make use of R for correlation and regression	2	2	1	2	2	-	-	-	-	-	-	-	2	1	2	2
			CO5	Build appropriate statistical tests using R.	1	2	1	2	2	-	-	-	-	-	-	-	2	1	2	2
V	70124513	Open Source Tools for Data Science	CO1	Analyze data exploration on Cognitive Class	2	1	1	1	2	-	-	-	1	-	-	1	1	-	2	2
			CO2	Infer basic and advanced features of Jupyter	1	1	1	1	3	-	-	-	1	-	-	1	1	-	2	2
			CO3	Compare Apache Zeppelin Notebooks with	1	1	-	-	-	-	-	-	1	-	-	1	1	-	2	2
			CO4	Examine Apache Spark in RStudio IDE	1	1	-	-	3	-	-	-	1	-	-	1	1	-	2	2
			CO5	Illustrate and examine Seahorse Workflows on	1	1	-	-	3	-	-	-	1	-	-	1	1	-	2	2
			CO6	Use OpenRefine for data	1	1	1	1	2	-	-	-	1	-	-	1	1	-	2	1
	Additional Specialization : AI																		2	1
V	70124510	Machine Learning: Regression	CO1	Interpret problems and select suitable regression	2	1													2	1
			CO2	Compare Linear and logistic regression	2	1													2	1
			CO3	Determine the need of regularised regression	1	1	1												2	1
			CO4	. Assess case studies of applications of regression	1	1	1		1										2	1
			CO5	Explain hybrid regression techniques	1	1	1		1											
V	70124509	Machine Learning: Classification	CO1	Interpretclassification problems	2	1														
			CO2	Compareprobability and classification techniques	2	1													2	2
			CO3	Explain ensemble methods	2	1													2	2
			CO4	Assess case studies of classification problems	1	1	1		1										2	2
	Additional Specialization :																		2	2
V	70124511	Cloud Computing	CO1	Explore technologies that comprise the modern	2	2	2	2	2	-	-	-	-	-	-	-	-		2	1
			CO2	Investigate major concepts in cloud computing,	2	2	2	2	2	-	-	-	-	-	-	-	2	2	2	1
			CO3	Deep dive virtualization and containers with	2	2	2	2	2	-	-	-	-	-	-	-	-	-	2	1
			CO4	Compare the infrastructure as a service offering	2	2	2	2	2	-	-	-	-	-	-	-	-	-	2	1
			CO5	Explore cloud middleware technologies that are	2	1	2	2	2	-	-	-	-	-	-	-	-	-	2	1
			CO6	Learn Hive, HDFS and Ceph as pure Big Data	2	1	2	2	2	-	-	-	-	-	-	-	-	-	2	1
V	70124512	Cloud Environment in Public model	CO1	Design Resilient Architectures	2	2	2	2	2	-	-	-	-	-	2	2	2	2		
			CO2	Define Performant Architectures	2	2	2	2	2	-	-	-	-	-	2	2	2	2		
			CO3	Specify Secure Applications and Architectures	2	2	2	2	2	-	-	-	-	-	2	2	2	2	2	2
			CO4	Design Cost-Optimized Architectures	2	2	2	2	2	-	-	-	-	-	2	2	2	2	2	2
			CO5	Define Operationally-Excellent Architectures	2	2	2	2	2	-	-	-	-	-	2	2	2	2	2	2
	Additional Specialization :																		2	2
V	70124515	Introduction to Game Development	CO1	Understand the major concepts of Game	2	2	2	2	2	-	-	-	1	-	2	2	2	-	2	2
			CO2	Understanding the concepts of 3D game	2	2	2	2	2	-	-	-	1	-	2	2	2	-	1	-
			CO3	Implement the Gaming User Interface.	2	2	2	2	2	-	-	-	1	-	2	2	2	-	1	-
			CO4	Demonstrate the unity game programming	2	2	2	2	2	-	-	-	1	-	2	2	2	-	-	-
V	70124516	Principles of Game Design	CO1	Understand the major concepts of Game Design	2	2	2	2	2	-	-	-	1	-	2	2	2	-	-	-
			CO2	Understanding the concepts of Game Design.	2	2	2	2	2	-	-	-	1	-	2	2	2	-	-	-
			CO3	Understand and Implement the Gameplay design and mechanics.	2	2	2	2	2	-	-	-	1	-	2	2	2	-	2	2
			CO4	Demonstrate the game prototyping.	2	2	2	2	2	-	-	-	1	-	2	2	2	-	2	2
	Additional Specialization :																		2	2
V	70124520	Usable Security	CO1	Discover user-centered interactions while	3	3	1	3	2	3	1	3	2	1	1	2	2	2	2	2
			CO2	Discover the concerns associated privacy	3	3	1	3	2	3	1	3	2	1	1	2	2	2	2	2
			CO3	Discover the concerns associated with cyber	3	3	1	3	2	3	1	3	2	1	1	2	2	2	2	2
			CO4	Articulate the urgent need for usability security	3	3	1	3	2	3	1	3	2	1	1	2	2	2	2	2
			CO5	Discover and explain cyber security threats,	3	3	1	3	2	3	1	3	2	1	1	2	2	2	2	2
			CO6	Articulate the urgent need for Usable Privacy	3	3	1	3	2	3	1	3	2	1	1	2	2	2	2	2

VI	70124519	Software Security	CO1	Discover software bugs that pose cyber security	3	3	2	3	1	3	1	3	2	1	1	2	1	1	2	2
			CO2	Defending against low-level exploits	3	3	2	3	1	3	1	3	2	1	1	2	1	1		
			CO3	Discover cyber attack scenarios to web browsers,	3	3	2	3	1	3	1	3	2	1	1	2	1	1	2	-
			CO4	Articulate the urgent need for software security	3	3	2	3	1	3	1	3	2	1	1	2	1	1	2	-
			CO5	Discover and explain mobile software bugs	3	3	2	3	1	3	1	3	2	1	1	2	1	1	2	-
			CO6	Articulate the cyber threats to critical	3	3	2	3	1	3	1	3	2	1	1	2	1	1	2	-
	Additional Specialization :																		2	-
VI	70124517	Introduction to IOT	CO1	Explore on ARM CORTEX M3 microcontroller	2	2	1	1	1	-	-	-	-	-	-	1	1	1	2	-
			CO2	Experiment on interfacing sensors with	2	2	2	2	1	-	-	-	-	-	-	1	1	1	2	-
			CO3	Relate various key enablers of IoT.	2	2	1	1	1	-	-	-	-	-	-	1	1	1	2	-
			CO4	Distinguish between IoT/M2M Communications	2	2	1	1	2	-	-	-	-	-	-	1	1	1	2	-
			CO5	Practically experience the concept of lightweight	2	2	2	2	2	-	-	-	-	-	-	1	1	1	2	-
			CO6	Understand the Internet connectivity of IoT	2	2	1	1	1	-	-	-	-	-	-	1	1	1		
VI	70124518	Raspberry PI and Python	CO1	Distinguish between Arduino and Raspberry Pi	3	2	1	1	1	-	-	-	-	-	-	1	-	1		
			CO2	Associate knowledge of Raspberry Pi with	3	2	2	2	1	-	-	-	-	-	-	1	-	1		
			CO3	Experiment on Raspberry Pi board using Python	3	2	3	2	2	-	-	-	-	-	-	1	-	1		
			CO4	Synthesize the prior understanding on Raspberry	3	2	3	1	2	-	-	-	-	-	-	1	-	1		
VI	70124601	Distributed Systems and Resource Management	CO1	Sketch the architecture of the multicomputer	2	2	2	2	2	-	-	-	-	-	-	-	2	2		
			CO2	Implement the clock synchronization algorithms	2	2	2	2	2	-	-	-	-	-	-	-	2	2		
			CO3	Execute the deadlock detection techniques for the	2	2	2	2	2	-	-	-	-	-	-	-	2	2		
			CO4	Use the recovery techniques of the single	2	2	2	2	2	-	-	-	-	-	-	-	2	2		
			CO5	Execute the shared memory solutions to build a	2	2	2	2	2	-	-	-	-	-	-	-	2	2		
			CO6	Demonstrate the working of distributed file	2	2	2	2	2	-	-	-	-	-	-	-	2	2		
VI	70124603	Cyber Security	CO1	Analyze and illustrate threat models	3	2	1	1	2	1	1	1	1	1	1	1				
			CO2	Examine the different cyber laws and their	2	2	1	1	1	3	1	1	1	1	1	1			2	2
			CO3	Compare and contrast the implemented management practices in the cyber world	2	2	2	2	1	1	1	1	1	1	1	1			2	2
	Program Elective-I (Choose any one from the following)																		2	2
VI	70124619	Data Warehousing and Mining	CO1	Outline and organize architecture of data warehouse and its components.	3	3	3	2	3	1	-	-	2	1	1	-	3	2	2	2
			CO2	Illustrate data mining concepts and algorithms.	3	3	3	2	3	1	-	-	2	1	1	-	3	2	2	2
			CO3	Analyze multidimensional data using "Online Analytical Processing" tool.	3	3	2	2	3	1	-	-	2	1	1	-	3	2	2	2
			CO4	Experiment how to produce a quantitative analysis report/memo with the necessary information to make decisions.	3	3	2	2	3	1	-	-	2	1	1	-	3	2	2	2
			CO5	Demonstrate basic data mining algorithms, methods, and tool.	3	3	2	2	3	1	-	-	2	1	1	-	3	2	2	2
			CO6	Test and compare different data mining algorithms such as A-priori, Decision Tree Classifier, K-means clustering.	3	3	2	2	3	1	-	-	2	1	1	-	3	2	2	2
VI	70124620	Internet of Things	CO1	Learn and explore the basics of networking.	2	1	1	1	2	1	-	-	-	-	-	-	1	1	2	2
			CO2	Experience data collection from sensors using microcontroller device.	2	2	2	2	2	1	-	-	-	-	-	-	1	1	2	2
			CO3	Demonstrate understanding on CoAP and MQTT protocols.	2	2	2	2	2	1	-	-	-	-	-	-	1	1	2	2
			CO4	Develop clear understanding on IoT Cloud integration.	2	2	2	2	2	1	-	-	-	-	-	-	1	1	2	2
			CO5	Explore on IoT privacy issue and Blockchain	1	2	1	2	2	1	-	-	-	-	-	-	1	1		
VI	70124621	Image Processing	CO1	Illustrate basics of digital image processing	2	1	2	2	2	1	1	1	1	1	1	1	1	1		
			CO2	Analyze two-dimensional systems, image coding, compression and pattern recognition	1	2	2	2	2	1	1	1	1	1	1	1	1	1	2	2
			CO3	Examine recognition, classification, grey level	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2	2
			CO4	Apprise segmentation, frequency approach,	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2	2
	Program Elective-I Lab(Choose																		2	2
VI	70124622	Data Warehousing and Mining Lab	CO1	----------Analyze	3	2	2	2	3	1	-	-	1	1	-	-	3	2	2	2
			CO2	Apply different data pre-processing steps on a data set	3	2	2	2	3	1	-	-	1	1	-	-	3	2	2	2
			CO3	Experiment how to produce a quantitative analysis report/memo with the necessary	3	2	2	2	3	1	-	-	1	1	-	-	3	2	2	2
			CO4	Demonstrate basic data mining algorithms, methods, and tool	3	2	2	2	3	1	-	-	1	1	-	-	3	2	2	2
			CO5	Test and compare different data mining	3	2	2	2	3	1	-	-	1	1	-	-	3	2		
VI	70124623	Internet of Things Lab	CO1	To experiment and understand the basics of	2	1	2	2	2	1	-	-	-	-	-	1	2	1	3	2
			CO2	To experiment and understand the interfacing of	2	1	2	2	2	1	-	-	-	-	-	1	2	1	3	2
			CO3	To learn and express your understanding of local	1	2	2	2	2	1	-	-	-	-	-	1	2	1	3	2
			CO4	To express your understanding on messaging	2	2	2	2	2	1	-	-	-	-	-	1	2	1	3	2
			CO5	To synthesize your understanding and develop a	2	2	2	2	2	1	-	-	-	-	-	1	2	1	3	2
			CO6	To test and understand data analytics at cloud	2	1	2	2	3	1	-	-	-	-	-	1	2	1	1	1
	Program Elective –II (Choose																		3	1
VI	70124625	Artificial Intelligence	CO1	Explain definition, goals and applications of	2	2	2	2	3	1	-	-	-	-	-	-	3	-	3	1
			CO2	Illustrate various properties of Internal	2	1	2	2	3	1	-	-	-	-	-	-	3	-	3	1
			CO3	Evaluate solving problems in AI by various	2	3	2	2	3	1	-	-	-	-	-	-	3	-	1	1
			CO4	Illustrate various knowledge representations	2	2	2	2	3	1	-	-	-	-	-	-	3	-		
			CO5	Analyze and apply various AI techniques to real	2	2	2	2	3	1	-	-	-	-	-	-	3	-	1	1
			CO6	ApplyNatural Language Processing	2	2	2	2	3	1	-	-	-	-	-	-	3	-	1	1
			CO7	Outline and organizearchitecture of Expert	2	2	2	2	3	1	-	-	-	-	-	-	3	-	1	1
			CO8	Illustrate various learning techniques including	2	2	2	2	3	1	-	-	-	-	-	-	3	-	1	1
VI	70124626	Human Computer Interface	CO1	Analyze the role of user in information Systems.	2	2	2	2	2	1	-	-	-	-	-	2	2	2	1	1
			CO2	Examine different models in development of an	2	2	2	2	2	1	-	-	-	-	-	2	2	2	1	2
			CO3	Outline the phases of designing user friendly	2	2	2	2	2	1	-	-	-	-	-	2	2	2	1	2
			CO4	Categorize various documentation like CSCW,	2	2	2	2	2	1	-	-	-	-	-	2	2	2	1	2
			CO5	Explore new modes of Human Computer	2	2	2	2	2	1	-	-	-	-	-	2	2	2	1	2
VI	70124627	Advanced Algorithms	CO1	To learn and apply Algorithm complexity	2	2	2	2	2	1	-	1	1	1	1	2	2	2	1	2
			CO2	To introduce advanced algorithm design strategies.	3	3	3	2	1	1	1	1	2	2	2	2	1	1	-	-
	Program Elective-II																		-	-
VI	70124628	Artificial Intelligence Lab	CO1	Evaluate various Artificial Intelligence (AI)	2	2	2	1	2	1	-	-	-	-	-	-	3	-	-	-
			CO2	Correlate and use perceptron models & networks	2	2	2	1	2	1	-	-	-	-	-	-	3	-	-	-
			CO3	Experiment with different models of NLP	2	2	2	1	2	1	-	-	-	-	-	-	3	-	-	-
			CO4	Plan and outline concepts of an Expert System using various case studies	2	2	2	1	2	1	-	-	-	-	-	-	3	-	-	-
		Human	CO1	Analyze the role of user in information Systems.	2	2	2	2	2	1	-	-	-	-	-	2	2	2		
			CO2	Examine different models in development of an	2	2	2	2	2	1	-	-	-	-	-	2	2	2		

VI	70124629	Computer Interface LAB	CO3	Outline the phases of designing user friendly	2	2	2	2	2	1	-	-	-	-	-	2	2	2		
			CO4	Categorize various documentation like CSCW,	2	2	2	2	2	1	-	-	-	-	-	2	2	2		
			CO5	Explore new modes of Human Computer	2	2	2	2	2	1	-	-	-	-	-	2	2	2	-	
VI	70124630	Advanced Algorithms Lab	CO1	To learn and apply Algorithm complexity	2	2	2	2	2	1	-	1	1	1	1	2	2	2	1	-
			CO2	To introduce advanced algorithm design	3	3	3	2	1	1	1	1	2	2	2	2	1	1	2	1
	Open Elective-IV(Choose any one from the																		-	1
VI	70124633	Machine Learning	CO1	Develop an appreciation for what is involved in	2	2	2	2	3	1	-	-	-	-	-	-	3	1	3	-
			CO2	Formulate the mapping of a wide variety of pre-	2	2	2	2	3	1	-	-	-	-	-	-	3	1	-	2
			CO3	Summarize the analysis given by validated learning algorithms	2	2	2	2	3	1	-	-	-	-	-	-	3	1	3	-
			CO4	Explain ANN algorithms to achieve signal	2	2	2	2	3	1	-	-	-	-	-	-	3	1	2	-
			CO5	Plan and execute successful machine learning	2	2	2	2	3	1	-	-	-	-	-	-	3	1	2	1
VI	70124637	Open Source Technologies	CO1	Relate to the idea of adoption of Open Source	2	1	1		2	-	-	--	-	-	-	1	1	-	2	1
			CO2	Identify and outline the need for licenses and	2	1	1	1	-	-	-	-	1	-	-	1	1	-	2	1
			CO3	Analyze the basic idea of open source	1	1	1	1	-	-	-	-	1	-	-	1	1	-	1	1
			CO4	Examine and analyze various open source	1	1	1	1	3	-	-	-	1	-	-	1	1	-	2	1
			CO5	Outline and distinguish between open source and	1	1	1	1	3	-	-	-	1	-	-	1	1	-	1	1
VI	70124638	Basics of Database	CO1	Describe database system, its components and	3	2	3	3	3	2	1	1	1	1	2	2	2	1	2	1
			CO2	Distinguish relational model with the Structured	3	3	3	2	3	2	1	1	1	1	1	1	3	1	2	1
			CO3	Illustrate Normalization process with its types.	3	3	3	2	2	2	1	1	1	1	1	1	3	1	2	2
			CO4	Explain structure of file, types of Indexing and	3	3	3	2	2	2	1	1	1	1	1	1	2	1	2	2
VI	70124639	Introduction to BIG DATA	CO1	Differentiate between Name Node, Secondary Name Node, Data Node.	2	2	2	-	2	-	-	-	-	-	-	-	2	1	3	-
			CO2	Compare MapReduce-1 and MapReduce-2	2	2	2	-	2	-	-	-	-	-	-	-	2	1	2	-
			CO3	Differentiate Hive and RDBMS.	2	2	2	-	2	-	-	-	-	-	-	-	2	1	2	1
			CO4	Experiment pig queries and examine the	2	2	2	-	2	-	-	-	-	-	-	-	2	1	2	1
			CO5	Test Sorting, Aggregate functions in HiveQL.	2	2	2	-	2	-	-	-	-	-	-	-	2	1	2	-
			CO6	Analyze Query execution performance with in-	2	2	2	-	2	-	-	-	-	-	-	-	2	1	2	-
	Additional Specialization :																		2	-
VI	70124611	Business Analytics	CO1	Analyze relevant statistical tools applicable for	2	2	2	1	3	-	-	-	-	-	-	-	3	-	2	-
			CO2	Experiment the numeric data analysis using	2	2	2	2	3	-	-	-	-	-	-	-	3	-	2	-
			CO3	Infer data and procedures in R	2	2	2	1	3	-	-	-	-	-	-	-	3	-	3	3
			CO4	Experiment decision tree and clustering problems	2	2	2	1	3	-	-	-	-	-	-	-	3	-	3	3
			CO5	Analyze time series forecasting, predictive	2	2	2	2	3	-	-	-	-	-	-	-	3	-	3	3
			CO6	Experiment the working areas of big data and	2	2	2	1	3	-	-	-	-	-	-	-	3	-	3	3
VI	70124612	Power BI	CO1	Infer the various data preparation activities.	2	2	2	1	3	-	-	-	-	-	-	-	3	-	3	3
			CO2	Model data as an expert BI analyst	2	1	2	1	3	-	-	-	-	-	-	-	3	-	3	3
			CO3	Examine different practises for development of reports and dashboards.	2	1	2	1	3	-	-	-	-	-	-	-	3	-	2	1
			CO4	Experiment various power BI tools and	2	2	2	1	3	-	-	-	-	-	-	-	3	-	2	1
	Additional Specialization : AI																		2	1
VI	70124608	Machine Learning Clustering & Retrieval	CO1	Evaluate the concepts related to data, clustering	2	1													2	1
			CO2	Assess the NN search details and compare it with	2	2	1		1										2	1
			CO3	Evaluate the concepts related to unsupervised	2	2			2										2	1
			CO4	Choose and conclude the results of analysis	2	2			1										2	2
VI	70124607	Introduction to Deep Learning	CO1	Develop the basic understanding and concepts of	2	2	2	2	2										2	2
			CO2	Experiment with NN and optimisation	2	2	2	2	2										2	2
			CO3	Construct the model(s) using various deep	2	2	2	2	2										2	2
			CO4	Identify and apply mathematical details of CNN.	2	2	2	2	2										2	2
			CO5	Build model using RNN.	2	2	2	2	2										2	2
			CO6	Choose a specific learning technique to provide	2	2	2	2	2										3	2
	Additional Specialization :																		3	2
VI	70124511	Cloud Computing Platforms	CO1	Infer the various cloud services of Azure.	2	2	2	1	2	2	2	2	2	-	-	-	2	-	3	2
			CO2	Relate Azure PowerShell, the Azure Software	2	2	2	1	2	2	2	2	2	-	-	-	2	-	3	2
			CO3	Test Azure to deploy the highly available and scalable configuration of Azure virtual machines,	2	2	2	1	2	2	2	2	2	-	-	-	2	-	2	1
			CO4	Experiment creation and deployment of Web	2	2	2	1	2	2	2	2	2	-	-	-	2	-	2	1
			CO5	Model virtual networks using variety of virtual	2	2	2	1	2	2	2	2	2	-	-	-	2	-	2	1
			CO6	Examine use of Azure cloud storage and its	2	2	2	1	2	2	2	2	2	-	-	-	2	-	2	1
			CO7	Relate use of Microsoft Azure SQL Database to	2	2	2	1	2	2	2	2	2	-	-	-	2	-	2	1
			CO8	Experiment Azure AD, Azure Multi-Factor	2	2	2	1	2	2	2	2	2	-	-	-	2	-	2	1
VI	70124609	Block Chain	CO1	Explore overview of the essential concepts of	2	2	2	2	2	1	-	-	-	-	-	-	2	2	2	1
			CO2	Exploring the Bitcoin protocol followed by the	2	2	2	2	2	1	-	-	-	-	-	-	2	2	3	1
			CO3	Design the decentralized peer-to-peer network,	2	2	2	2	2	1	-	-	-	-	-	-	2	2	3	1
			CO4	Explain verification, validation, and consensus	2	2	2	2	2	1	-	-	-	-	-	-	2	2	2	1
			CO5	Design hashing and cryptography foundations	2	2	2	2	2	1	-	-	-	-	-	-	2	2	3	2
	Additional Specialization : Game Design and Development																		2	1
VI	70124614	Entrepreneurship in Game Development	CO1	Understand the various business models for the game.	2	2	2	2	2	-	-	-	1	-	2	2	2	-	2	2
			CO2	Study and understand the project management techniques.	2	2	2	2	2	-	-	-	1	-	2	2	2	-	2	2
			CO3	Build the portfolio for pitching the game.	2	2	2	2	2	-	-	-	1	-	2	2	2	-	2	2
			CO4	Plan for starting own company	2	2	2	2	2	-	-	-	1	-	2	2	2	-	2	2
VI	70124613	Modern Platforms in Game Development	CO1	Understanding the various gaming platforms.	2	2	2	2	2	-	-	-	1	-	2	2	2	-	2	2
			CO2	Implement the various stages of game design.	2	2	2	2	2	-	-	-	1	-	2	2	2	-	2	2
			CO3	Implement the various stages of game design.	2	2	2	2	2	-	-	-	1	-	2	2	2	-	2	2
			CO4	Execution of the game on various operating	2	2	2	2	2	-	-	-	1	-	2	2	2	-		
	Additional Specialization :																			
VI	70124617	Cryptography	CO1	To make use of standard algorithms	3	3	1	3	2	3	1	3	2	1	1	2	2	2		
			CO2	To identify various key distribution and	3	3	1	3	2	3	1	3	2	1	1	2	2	2		
			CO3	To experiment with block ciphers for encryption	3	3	1	3	2	3	1	3	2	1	1	2	2	2		
			CO4	To identify various cryptanalysis techniques.	3	3	1	3	2	3	1	3	2	1	1	2	2	2		
			CO5	To model security applications in the field of	3	3	1	3	2	3	1	3	2	1	1	2	2	2		
VII	70124618	Hardware Security	CO1	Learning the design of digital system,	2	2	2	2	1	1	1	1	1	1	1	1	1	1		
			CO2	Better understanding of attacks and providing	3	3	3	3	1	1	1	1	1	1	1	1	1	1		
			CO3	Understand and implement cryptography	3	3	3	3	2	1	1	1	1	1	1	1	1	1		
			CO4	Detection and isolation of hardware Trojans	3	3	3	3	2	1	1	1	1	1	1	1	1	1		
			CO5	Protection of the design intellectual property	2	1	1	1	1	1	1	1	1	1	1	1	1	1		
	Additional Specialization :																			
			CO1	Familiarize with the fundamentals of network	2	1	1	1	1	1	-	-	-	-	-	1	-	-		

VII	70124615	IOT Security and Privacy	CO2	Analyse cryptography for IoT.	3	2	1	1	1	-	-	-	-	-	-	1	-	-		
			CO3	Experimental study and deeper understanding on	3	2	1	1	2	-	-	-	-	-	-	1	-	1		
			CO4	Analytical study on privacy challenges in IoT	2	2	2	1	2	-	-	-	-	-	-	1	-	1		
			CO5	Relating neural network to address modern	2	1	1	1	1	-	-	-	-	-	-	1	-	-		
VII	70124616	Software Defined Networking	CO1	Distinguish traditional network and SDN and	2	2	1	1	2	-	-	-	-	-	-	1	-	1		
			CO2	Relate the concepts of SDN with OpenFlow and	2	2	2	2	2	-	-	-	-	-	-	1	-	1		
			CO3	Associate and experiment knowledge of SDN	1	2	2	2	2	-	-	-	-	-	-	1	-	1		
			CO4	Analyse network function virtualization	2	2	2	2	2	-	-	-	-	-	-	1	-	1		
			CO5	Synthesize the concepts of fog computing with	2	1	2	2	2	-	-	-	-	-	-	1	-	1		
VII	70124702	Search Engine Optimization	CO1	Demonstrate various types of digital marketing	1	2	1	1	2	-	-	-	-	2	1	2	-	-		
			CO2	Apply the process of Search Engine Optimization	2	2	2	1	2	-	-	-	-	1	1	1	-	-		
			CO3	Modify a search engine optimized website by	2	2	2	1	2	-	-	-	1	1	1	1	1	-		
			CO4	Prepare the advancements in SEO practices that	2	2	1	1	2	-	-	-	1	1	1	1	1	-		
			CO5	Demonstrate the exploitation of social	1	1	1	1	2	-	-		1	1	1	1	1	-		
VII	70122711	Neural Networks	CO1	Outline the basic concepts of Neural Networks	2	2	1	1	1	1	1	1	1	1	1	1	1	-		
			CO2	Apply various NN learning processes and rules.	2	2	1	2	1	1	1	1	1	1	1	1	1			
			CO3	Sketch and use various Perceptron Models &	3	2	2	2	1	1	1	1	1	1	1	1	1			
			CO4	Apply multilayer perceptron models in real life	2	2	2	2	1	1	1	1	1	1	1	1	1			
			CO5	Implement and use NN theorems, models and	2	2	2	2	1	1	1	1	1	1	1	1	1			
VII	70122709	Data Science	CO1	Introduction to major concepts in data science.	2	-	1	-	2	1	-	2	1	-	-	1	-	-		
			CO2	Use of R language to carry out basic statistical	3	3	3	3	3	3	-	2	2	1	-	-	-			
			CO3	To understand the significance of exploratory												-	-			
			CO4	Apply basic machine learning algorithms for	3	3	3	2	2	-	-	2	2	-	-	-	-			
			CO5	To createeffective visualization of given data.	1	2	2	2	2	-	-	1	-	-	1	-	-			
			CO6	Understanding ethical and privacy issues in data	2	1	2	2	3	1	-	3	3	1	3		-			
VII	70122710	Optimization Techniques & Algorithms	CO1	Explain the use of optimization techniques and	3	3	1	2	1	1	-	-	-	-	-	-	1	-		
			CO2	Understand the use of modern optimization	3	3	3	2	1	1	-	-	-	-	-	-	1	-		
			CO3	Explain Genetic Algorithm and its application to	3	3	3	2	2	1	-	-	-	-	-	-	1	-		
			CO4	Explain Particle Swarm Optimization and Cohort	3	3	3	2	2	1	-	-	-	-	-	-	1	-		
VII	70124711	Neural Networks Lab	CO1	Choose and relate, Artificial Neural Networks	1	2	1	2	2	1	1	1	1	1	1	1	1	1		
			CO2	Prepare and use ANN learning rules.	2	2	2	1	1	1	1	1	1	1	1	1	1	1		
			CO3	Sketch and use Perceptron Models & Networks.	2	1	2	1	2	1	1	1	1	1	1	1	1	1		
			CO4	Compute using various ANN training models.	2	1	3	1	2	1	1	1	1	1	1	1	1	1		
			CO5	Use and demonstrate several ANN theorems.	2	2	2	1	1	1	1	1	1	1	1	1	1	1		
			CO6	Apply ANN models to solve real world problems.	2	2	3	2	1	1	1	1	1	1	1	1	1	1		
VII	70124712	Data Science Lab	CO1	Demonstrate implementation of statistical	2	2	2	2	2	1	-	-	-	-	-	-	2	-		
			CO2	Demonstrate the application of R package for	2	2	2	2	2	1	-	-	-	-	-	-	2	-		
VII	70122713	Optimization Techniques & Algorithms Lab	CO1	Explain the use of optimization techniques and	3	3	1	2	1	1	-	-	-	-	-	-	1	-		
			CO2	Understand the use of modern optimization	3	3	3	2	1	1	-	-	-	-	-	-	1	-		
			CO3	Explain Genetic Algorithm and its application to	3	3	3	2	2	1	-	-	-	-	-	-	1	-		
			CO4	Explain Particle Swarm Optimization and Cohort	3	3	3	2	2	1	-	-	-	-	-	-	1	-		
VII	70124714	Machine Learning	CO1	Develop an appreciation for what is involved in	3	3	3	1	3	-	-	-	-	-	-	-	2	-		
			CO2	Formulate the mapping of a wide variety of pre-	3	3	3	2	3	-	-	-	-	-	-	-	2	-		
			CO3	Summarize the analysis given by validated	3	3	3	2	3	-	-	-	-	-	-	-	2	-		
			CO4	Explain ANN algorithms to achieve signal	3	3	3	2	3	-	-	-	-	-	-	-	2	-		
			CO5	Plan and execute successful machine learning	3	3	3	2	3	-	-	-	-	-	-	-	2	-		
VII	70124715	Network Security	CO1	Define the basics of cryptography.	3	3	2	3	1	3	1	3	2	1	1	2	1	1		
			CO2	Demonstrate and explain understanding on	3	3	2	3	1	3	1	3	2	1	1	2	1	1		
			CO3	Investigate collisions in hashing algorithms.	3	3	2	3	1	3	1	3	2	1	1	2	1	1		
			CO4	Explore modern public key cryptography e.g.	3	3	2	3	1	3	1	3	2	1	1	2	1	1		
			CO5	Exposed to various security protocols.	3	3	2	3	1	3	1	3	2	1	1	2	1	1		
			CO6	Obtain deeper understanding on Intrusion	3	3	2	3	1	3	1	3	2	1	1	2	1	1		
VII	70124716	Natural Language Processing	CO1	Learn and assess major NLP concepts, issues	2	2	2	2	2	1	-	-	-	-	-	2	2	2		
			CO2	Become agile with the elements of NLP	2	2	2	2	2	1	-	-	-	-	-	2	2	2		
			CO3	Learn how to parse or analyse the input given	2	2	2	2	2	1	-	-	-	-	-	2	2	2		
			CO4	Learn how to “Hear what's behind the words”	2	2	2	2	2	1	-	-	-	-	-	2	2	2		
			CO5	Use language influentially, using approaches	2	2	2	2	2	1	-	-	-	-	-	2	2	2		
			CO6	Compare and contrast approaches to NLP	2	2	2	2	2	1	-	1	1	1	1	2	2	2		
VII	70124717	Machine Learning Lab	CO1	Apply machine learning techniques in the design	2	2	2	2	3	-	-	-	-	-	-	-	2	-		
			CO2	Explain the relative strengths and weaknesses of	2	2	2	2	3	-	-	-	-	-	-	-	2	-		
			CO3	Methods and evaluate results	2	2	2	2	3	-	-	-	-	-	-	-	2	-		
			CO4	Demonstrate knowledge of the incremental	2	2	2	2	3	-	-	-	-	-	-	-	2	-		
			CO5	Evaluate cross validation techniques and give	2	2	2	2	3	-	-	-	-	-	-	-	2	-		
			CO6	Apply machine learning techniques to a selected	2	2	2	2	3	-	-	-	-	-	-	-	2	-		
VII	70124718	Network Security Lab	CO1	Network forensic lab using Nmap tool	3	3	3	3	3	1	1	1	3	2	1	2	3	1		
			CO2	Basic cryptography lab	3	3	3	3	3	1	1	1	3	2	1	2	3	1		
			CO3	Symmetric and Asymmetric key Encryption	3	3	3	3	1	1	1	1	3	2	1	2	3	1		
			CO4	Hashing	3	3	3	3	3	1	1	1	3	2	1	2	3	1		
VII	70124719	Natural Language Processing Lab	CO1	Learn and assess major NLP tools using open	2	2	2	2	2	1	-	-	-	-	-	2	2	2		
			CO2	Become agile with NLTK programming	2	2	2	2	2	1	-	-	-	-	-	2	2	2		
			CO3	Predict using NLP Models	2	2	2	2	2	1	-	-	-	-	-	2	2	2		
			CO4	Use language influentially, with the help of NLP t	2	2	2	2	2	1	-	-	-	-	-	2	2	2		
			CO5	Evaluate information retrieval details using Toolki	2	2	2	2	2	1	-	-	-	-	-	2	2	2		
			CO6	Develop an emotion detection /sentiment analysis	2	2	2	2	2	1	-	1	1	1	1	2	2	2		
VII	70124720	Computer Graphics	CO1	Describe concepts of computer graphics with	3	3	3	2	2	1	1	1	1	1	1	1	2	1		
			CO2	Express 2D and 3D transformations on objects.	3	3	3	2	2	1	1	1	1	1	1	2	2	1		
			CO3	Explain windowing and clipping techniques on lir	3	3	3	2	2	1	1	1	1	1	1	1	2	1		
			CO4	Illustrate hidden surfaces removal techniques,	3	2	1	2	2	1	1	1	1	1	1	1	2	1		
			CO5	Demonstrate the logic to develop animation and g	3	3	3	2	3	1	1	1	3	3	1	3	3	1		
VII	70124721	Software Testing Tools	CO1	Classify, distinguish and compare different	2	1	1	1	1	1	1	1	1	1	1	1	1	1		
			CO2	Analyse and design good test cases using	2	2	2	2	1	1	1	1	1	1	1	1	1	1		
			CO3	Analyse, classify and compare different	3	2	1	1	3	1	1	1	2	1	1	2	3	1		
VII	70124722	Cloud Computing	CO1	Explore technologies that comprise the modern	2	2	2	2	2	-	-	-	-	-	-	-	-	-		
			CO2	Investigate major concepts in cloud computing,	2	2	2	2	2	-	-	-	-	-	-	-	2	-		
			CO3	Deep dive virtualization and containers with	2	2	2	2	2	-	-	-	-	-	-	-	2	-		
			CO4	Compare the infrastructure as a service offering	2	2	2	2	2	-	-	-	-	-	-	-	2	-		
			CO5	Explore cloud middleware technologies that are	2	1	2	2	2	-	-	-	-	-	-	-	2	-		
			CO6	Learn Hive, HDFS and Ceph as pure Big Data	2	1	2	2	2	-	-	-	-	-	-	-	2	-		