SYMBIOSIS INTERNATIONAL (DEEMED UNIVERSITY)

Academic Year : 2023-24 Institute/ Branch Name : Symbiosis Institute of Technology Programme Name : Bachelor of Technology (Computer Science and Engineering)

Color Code Description:

Global	National / Local	Regional / National	

Sr. No.	GA. No.	Graduate Attributes	PO No.	Programme Outcomes	Relevance
1	GA1	Scholarship: research, inquiry and lifelong learning	PO01	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	
2	GA1	Scholarship: research, inquiry and lifelong learning	PO02	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	Regional / National
3	GA4	Employability: equipped with skills, attributes, leadership and entrepreneurial qualities that society needs; being capable of making a contribution to society through earning a living	PO03	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.	Global
4	GA1	Scholarship: research, inquiry and lifelong learning	PO04	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions	
5	GA4	Employability: equipped with skills, attributes, leadership and entrepreneurial qualities that society needs; being capable of making a contribution to society through earning a living	PO05	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.	Regional / National
6	GA2	Global citizenship: ethical, social and professional understanding	PO06	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice	
7	GA3	Eco-literate: sensitivity towards a sustainable environment	PO07	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	Global
8	GA2	Global citizenship: ethical, social and professional understanding	PO08	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	
9	GA4	Employability: equipped with skills, attributes, leadership and entrepreneurial qualities that society needs; being capable of making a contribution to society through earning a living	PO09	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	Regional / National
10	GA2	Global citizenship: ethical, social and professional understanding	PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	
11	GA1	Scholarship: research, inquiry and lifelong learning	PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	National / Local
12	GA1	Scholarship: research, inquiry and lifelong learning	PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change	
13	GA4	Employability: equipped with skills, attributes, leadership and entrepreneurial qualities that society needs; being capable of making a contribution to society through earning a living	PO13	Engg and Practical knowledge: To apply the concepts of computer engineering and practical knowledge in analysis, design and development of computing systems and applications to multi-disciplinary problems.	
14	GA4	Employability: equipped with skills, attributes, leadership and entrepreneurial qualities that society needs; being capable of making a contribution to society through earning a living	PO14	Cutting Edge Technologies: To provide a concrete foundation to the students in the cutting edge areas of Computer Science Engineering and further help them in excelling in the chosen areas of advanced computer science like Machine Learning, Algorithms, Data Science, Internet of Things, Computing and Data Security and privacy.	National / Local

Sr. No.	Semester	Institute Course Code	Catalog Course Code	Title	Course Outcome No	Course Outcome Statement	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12	PO13	PO14
1	I	701220101	TE7680	Mathematics-I	CO1	Apply successive differentiation to find nth derivative of different functions and the product of functions	Strong-H	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-
					CO2	Find limits of indeterminate forms and express the functions in the form of Taylor's and Maclaurin's series.	Strong-H	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-
					CO3	Apply the concepts of partial differentiation to solve problems on homogeneous functions, Jacobians and maxima & minima.	Strong-H	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-
					CO4	Determine the rank of a matrix and solve system of equations.	Strong-H	Strong-H	Moderate-M	-	-	-	-	-	-	-	-	-	-	-
					CO5	Find eigenvalues and eigenvectors of a matrix to diagonalize the matrix and apply Cayley-Hamilton theorem to find the inverse and higher powers of a matrix.	Strong-H	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-
					CO6	Demonstrate the concepts of vector space and linear transformation with basis and dimension and find null space and range of linear transformations.	Strong-H	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-
2	I	701220102	TE7694	Chemistry	CO1	Explain different terms and techniques, and solve numerical related to water treatment	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-
					CO2	Describe the basic concept in polymer chemistry and composites , classify types, mechanisms, properties and solve numericals related to polymers	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-
					CO3	Explain and use the concepts related to various spectroscopic analysis techniques	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-
					CO4	Describe the concepts related to fuel chemistry, solve numerical problems and study basic concepts in Energy science and Nanomaterials .	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-
					CO5	Explain and use the basic concepts related to Green chemistry, environmental chemistry and non-conventional energy sources	Moderate-M	Weak-L	-	-	-	Moderate-M	-	-	-	-	-	-	-	-
3	I	701220103	TE765	Chemistry Lab	CO1	Apply the theoretical knowledge related to water analysis to practical use.	Moderate-M	Weak-L	-	-	-	Moderate-M	-	-	Strong-H	-	-	-	-	-
					CO2	Prepare a polymer and determine the molecular weight of polymers.	Moderate-M	Weak-L	-	-	-	Moderate-M	-	-	Strong-H	-	-	-	-	-
					CO3	Identify the percentage of moisture and ash in fuel samples.	Moderate-M	Weak-L	-	-	-	Moderate-M	-	-	Strong-H	-	-	-	-	-
					CO4	Utilize the laws of spectroscopy for spectroscopic analysis .	Moderate-M	Weak-L	-	-	-	Moderate-M	-	-	Strong-H	-	-	-	-	-
4	I	701220104	T7540	Basic Electrical and Electronics Engineering	CO1	Apply the laws and principles to analyze and solve specific electric circuits	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-
					CO2	Acquire knowledge about basic principles, working; applications of DC machines and single-phase transformers.	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-
					CO3	Apply the knowledge of diodes, Zener diodes, and BJTs to practical applications	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-
					CO4	Comprehend the operation of binary digital systems and implement the logic gates using boolean algebra	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-
					CO1	Understand the need of various safety precautions to be undertaken while working with electrical equipment and learn different components and wiring schemes.	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-

#	Sem	Course Code	Code	Course	CO	Outcome	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
5	I	701220105	T7593	Basic Electrical and Electronics Engineering Lab	CO2	Apply the knowledge of relevant laws and principles and familiarize with different theorems and analytical approaches for solving a given electric circuit.	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO3	Illustrate the characteristics of basic semiconductor devices like, pn junction diode, Zener Diode and BJTs, their different configurations, and applications.	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO4	Understand different controls of equipment like CRO and DMM.	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	I	701220106	TE7286	Programming and Problem Solving	CO1	Understand computational thinking concepts.	Moderate-M	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-
					CO2	Demonstrate Python programming concepts such as selection , repetition ,list,tupules and dictionaries .	Moderate-M	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-
					CO3	Illustrate functions and modules .	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	-
					CO4	Implement object oriented programming concepts .	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	-
7	I	701220107	TE7287	Programming and Problem Solving Lab	CO1	Use flowcharts and algorithms to represent simple computational problem.	Moderate-M	Moderate-M	Weak-L	-	Moderate-M	-	-	-	-	Moderate-M	-	Moderate-M	-	-	-
					CO2	Solve problems using conditionals and loops in Python.	Moderate-M	Moderate-M	Weak-L	-	Moderate-M	-	-	-	-	Moderate-M	-	Moderate-M	-	-	-
					CO3	Apply Python lists, tuples and dictionaries to represent compound data.	Moderate-M	Moderate-M	Moderate-M	-	Moderate-M	-	-	-	-	Moderate-M	-	Moderate-M	-	-	-
					CO4	Construct Python program by using functions.	Moderate-M	Moderate-M	Moderate-M	-	Moderate-M	-	-	-	-	Moderate-M	-	Moderate-M	-	-	-
					CO5	Implement object-oriented programming concepts.	Moderate-M	Moderate-M	Moderate-M	-	Moderate-M	-	-	-	-	Moderate-M	-	Moderate-M	-	-	-
8	I	701220108	T7915	Engineering Graphics Lab	CO1	Understand and draw projections of points (0D) located in four quadrants	Weak-L	Weak-L	-	-	-	-	-	-	-	-	Moderate-M	-	-	-	-
					CO2	Visualize, plan and draw projections of lines (1D) and planes (2D) (inclined to both planes of projection)	Weak-L	Weak-L	-	-	-	-	-	-	-	-	Moderate-M	-	-	-	-
					CO3	Visualize and draw projections of regular solids (3D) (inclined to both planes of projection) and sections of regular solids (front view, top view and true shape)	Weak-L	Weak-L	-	-	-	-	-	-	-	-	Moderate-M	-	-	-	-
					CO4	Visualize and communicate 3D regular/irregular shapes as 2D engineering drawings and vice versa using orthographic/isometric/development principles	Weak-L	Weak-L	-	-	-	-	-	-	-	-	Moderate-M	-	-	-	-
9	I	701220109	T6732	CRITICAL THINKING	CO1	Acquire better decisions based on logical thinking.	Moderate-M	Weak-L	Moderate-M	-	-	-	-	Weak-L	-	-	Moderate-M	-	-	-	-
					CO2	Identify and evaluate facts in an argument.	Moderate-M	Weak-L	Moderate-M	-	-	-	-	Weak-L	-	-	Moderate-M	-	-	-	-
					CO3	Draw truth, ambiguity, vagueness and fallacy in argument.	Moderate-M	Weak-L	Weak-L	-	-	-	-	-	-	-	Moderate-M	-	-	-	-
					CO4	Construct questions to reach conclusions	Weak-L	Weak-L	Weak-L	-	-	-	-	-	-	-	Weak-L	-	-	-	-
10	I	701220110	TE7749	Software Tools for Computer Science	CO1	To understand the basic components of a Ms Excel and their significance.	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO2	To perform arithmetic operations and functions	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO3	To store, organize and analyze the data using Ms Excel	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO4	To enable the students in crafting professional word documents, power point presentations using the Microsoft suite of office tools.	Weak-L	-	-	-	-	-	-	-	-	Weak-L	-	-	-	-	-
					CO5	To illustrate descriptive statistics using modern tools.	-	-	-	Moderate-M	-	-	-	-	-	-	-	-	-	-	-
					CO6	To understand current trends and tools in computer engineering	-	-	-	Moderate-M	-	-	-	-	-	-	-	-	-	-	-
11	I	701220111	TE7300	Tinker Lab	CO1	Relate fundamental concepts/laws of science and engineering	Moderate-M	Strong-H	Weak-L	-	-	-	-	-	-	Moderate-M	Moderate-M	-	Moderate-M	-	-
					CO2	Practise pre-achieved skills on hardware and devices	Strong-H	Strong-H	Moderate-M	-	-	-	-	-	-	Moderate-M	Moderate-M	-	-	-	-
					CO3	Take apart and reassemble and/or repairing of engineering gadgets	Strong-H	Strong-H	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO4	Explore various aspects of tinkered devices/instruments	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	Moderate-M	Moderate-M	-	Moderate-M	-	-
					CO5	Design and make models out of creativity using raw material	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	Moderate-M	Moderate-M	-	Moderate-M	-	-
12	II	701220201	TE7681	Mathematics II	CO1	Solve multiple integrals in cartesian coordinate system and understand different concepts of vector differentiation.	Strong-H	Strong-H	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-
					CO2	Apply different tests of convergence to find the nature of infinite series.	Strong-H	Strong-H	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	-
					CO3	Express the function in the form of Fourier series and half range Fourier series.	Strong-H	Strong-H	Strong-H	-	-	-	-	-	-	-	-	-	-	-	-
					CO4	Apply different methods for solving linear differential equations along with their engineering applications.	Strong-H	Strong-H	Strong-H	-	-	-	-	-	-	-	-	-	-	-	-
					CO5	Determine analyticity of a function of a complex variable, find the harmonic conjugate and discuss conformal, bilinear mapping.	Strong-H	Strong-H	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-
					CO6	Evaluate complex line and contour integrals.	Strong-H	Strong-H	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-
13	II	701220202	TE7684	Physics for Computer Engineers	CO1	Describe the problem of particle in a box, solve the problems of quantum mechanics and explain basic principles of quantum computing.	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO2	Calculate probability of occupancy of given energy levels, explain the origin of bands in solids and draw E-k diagrams.	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO3	Distinguish between intrinsic and extrinsic semiconductors and describe their applications and solve related problems.	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO4	Explain the principle or working of lasers.	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO5	Describe superconducting effects and calculate related characteristic.	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-	-
14	II	701220203	TE7687	Physics Lab	CO1	Acquire ability to conduct, analyze and interpret experiments in Physics.	Moderate-M	Moderate-M	-	Strong-H	-	-	-	-	-	Moderate-M	Weak-L	-	-	-	-
					CO2	Demonstrate the required experimental skills of the given experiment.	Moderate-M	Moderate-M	-	Strong-H	-	-	-	-	-	Weak-L	Weak-L	-	-	-	-
					CO3	Analyze the given/ obtained data and interpret the result.	Moderate-M	Moderate-M	-	Moderate-M	-	-	-	-	-	Weak-L	Weak-L	-	-	-	-
					CO4	Communicate ideas/knowledge via verbal/written means and demonstrate the understanding of concepts.	Moderate-M	Weak-L	-	Weak-L	-	-	-	-	-	Weak-L	-	-	-	-	-
15	II	701220204	T7383	Communication Skills	CO1	Identify the barriers to effective communication in accordance with all types of communication; avoid or overcome them.	-	-	-	-	-	-	-	-	-	Strong-H	Weak-L	-	-	-	-
					CO2	Construct sentences effectively using grammar and vocabulary.	-	-	-	-	-	-	-	-	-	Strong-H	Moderate-M	-	-	-	-
					CO3	Demonstrate the 7 "c" of effective communication in varied situations.	-	-	-	-	-	-	-	-	-	Strong-H	Moderate-M	-	-	-	-
					CO4	Apply etiquettes in oral and written communication.	-	-	-	-	-	-	-	-	-	Strong-H	Weak-L	-	-	-	-
					CO5	Demonstrate writing skills and use in business and technical correspondence.	-	-	-	-	-	-	-	-	-	Strong-H	Moderate-M	-	-	-	-
16	II	701220205	T7384	Communication Skills Lab	CO1	Enhance ideas and concepts in the communication process well through vocabulary building, LSRW aptitude tests, mind mapping and brain storming etc.	-	-	-	-	-	-	-	-	Weak-L	Strong-H	Moderate-M	-	-	-	-
					CO2	Demonstrate linguistic competence- through accuracy in grammar, pronunciation and vocabulary.	-	-	-	-	-	-	-	-	-	Strong-H	Moderate-M	-	-	-	-
					CO3	Sketch creative side in formal as well as informal communication	-	-	-	-	-	-	-	-	-	Strong-H	Moderate-M	-	-	-	-
					CO4	Employ etiquettes in oral and written communication.	-	-	-	-	-	-	-	-	-	Strong-H	Weak-L	-	-	-	-
					CO5	Modify listening skills.	-	-	-	-	-	-	-	-	-	Strong-H	Weak-L	-	-	-	-
					CO6	Demonstarte articlation skills effectively while participating in Group discussions, debate or job interviews etc.	-	-	-	-	-	-	-	-	Weak-L	Strong-H	Weak-L	-	-	-	-
17	II	701220206	TE7288	Programming in C	CO1	Explain the basic concepts of C Programming for problem-solving such as C data types, syntax and constructs, decision making, branching and looping statements.	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	Moderate-M	-	-
					CO2	Define the concept of Array and Strings to solve different problems	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	Moderate-M	-	-
					CO3	Apply the concepts of Function modules, its usage	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	Moderate-M	-	-
					CO4	Explain the concepts of structures and unions: declaration, initialization and implementation.	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	Moderate-M	-	-
					CO5	Define the concept of pointers, declarations, initialization, operations on pointers and memory allocation using dynamic memory management functions	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	Moderate-M	-	-
18	II	701220207	TE7289	Programming in C Lab	CO1	Understand the programming in IDE (Integrated Development Environment) and write, execute and debug simple programs.	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO2	Interpret the programming tasks logically and understand making the pseudo-code and flowchart.	Moderate-M	Weak-L	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-
					CO3	Design and implement basic programming solutions including statements, macros, control structures and methods.	Moderate-M	Moderate-M	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-
					CO4	Understand and apply the concept of Array and Strings to solve problem statement.	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	-
					CO5	Understand and apply the concepts of structures and unions: declaration, initialization and implementation.	Moderate-M	Moderate-M	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-
					CO6	Understand the concepts of Function modules, its usage and memory allocation using Pointers	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	-
19	II	701220208	T6873	Creative Thinking	CO1	Understand the importance of right brain directed thinking complementing left brain directed thinking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO2	Employ processes and methods of creative problem solving in real life problems	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO3	Demonstrate creative and innovative thinking skills by the intersection of ideas from one field into another new field.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO4	Explore various disruptive innovations and techniques in the field of Engineering	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO5	Discover the solutions to engineering problems provided by nature and mimic to apply in seeking creative solutions.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	II	701220209	TE7689	Statistics and Probability	CO1	To study the nature and graphical representation of various types of data.	Strong-H	Strong-H	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-
					CO2	To discuss the various measures of central tendency, dispersions and applications of moments in studying the shape of the distributions	Strong-H	Strong-H	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-
					CO3	To study the correlation and regression analysis	Strong-H	Strong-H	Moderate-M	Strong-H	-	-	-	-	-	-	-	-	-	-	-
					CO4	To construct the Discrete and Continuous probability distributions and apply them in real life problems.	Strong-H	Strong-H	Moderate-M	Strong-H	-	-	-	-	-	-	-	-	-	-	-
21	III	701220301	TE7675	Discrete Mathematics and Graph Theory	CO1	Apply the principles and techniques of mathematical logic to analyze and reason about complex logical expressions, statements, and arguments.	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO2	Interpret sets and different relations through various mathematical techniques, including set operations and principles such as the principle of inclusion and exclusion.	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO3	Apply combinatorial principles and techniques to solve a wide range of counting and arrangement problems.	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO4	Develop a solid understanding of graph theory fundamentals, including definitions, types, terminology, and key concepts such as subgraphs, degree, walks, paths, circuits, and matrix representation.	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO5	Use various algorithms to find optimal solution for graph related problems.	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	-	-
22	III	701220302	T7996	Computer Organization	CO1	Explain computer evolution, components, interconnection structures, bus interconnection and apply various binary arithmetic algorithms on signed as well as unsigned numbers.	Moderate-M	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	Weak-L	Weak-L
					CO2	Summarize machine instructions, organization of 8086 microprocessor and register and pipelining techniques.	Weak-L	Weak-L	Weak-L	-	-	-	-	-	-	-	-	-	-	Moderate-M	Moderate-M
					CO3	Describe the hardwired control unit design methods and micro programmed control unit operations.	Weak-L	Weak-L	-	-	-	-	-	-	-	-	-	-	-	Moderate-M	Moderate-M
					CO4	Distinguish between different types of memories; understand the concepts and mapping techniques of virtual memory as well as cache memory.	Weak-L	Weak-L	-	-	-	-	-	-	-	-	-	-	-	Moderate-M	Moderate-M
					CO5	Interpret the Input / Output transfer techniques and discuss about the working mechanisms of various I/O peripherals	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-	Moderate-M	Moderate-M
23	III	701220303	TE7960	Data Structures	CO1	Summarize searching and sorting algorithms for problem-solving.	Strong-H	Weak-L	-	-	-	-	-	-	-	-	-	-	Weak-L	Weak-L	Weak-L
					CO2	Explain the types of linked lists and operations on them.	Strong-H	Weak-L	-	-	-	-	-	-	-	-	-	-	Weak-L	Weak-L	Weak-L
					CO3	Apply the various operations on the tree and BST.	Strong-H	Weak-L	-	-	-	-	-	-	-	-	-	-	Weak-L	Weak-L	Weak-L
					CO4	Apply the various operations on the graph data structure	Strong-H	Weak-L	-	-	-	-	-	-	-	-	-	-	Weak-L	Weak-L	Weak-L
					CO5	Describe the symbol table and solve problems using the AVL tree.	Strong-H	Weak-L	-	-	-	-	-	-	-	-	-	-	Weak-L	Weak-L	Weak-L
24	III	701220304	TE7959	Data Structures Lab	CO1	Analyze the complexity of searching & sorting algorithms by applying on data	Moderate-M	Weak-L	-	-	Weak-L	-	-	-	-	Weak-L	Weak-L	-	Weak-L	Moderate-M	Weak-L
					CO2	Apply and demonstrate the operations like create, insert, delete, reverse, concatenate, union, and intersection on different types of linked lists	Moderate-M	Weak-L	-	-	Weak-L	-	-	-	-	Weak-L	Weak-L	-	Weak-L	Moderate-M	Weak-L
					CO3	Apply different traversal techniques and operations on binary search trees	Moderate-M	Weak-L	-	-	Weak-L	-	-	-	-	Weak-L	Weak-L	-	Weak-L	Moderate-M	Moderate-M
					CO4	Experiment with different graph algorithms and apply them to solve real life problems	Moderate-M	Weak-L	-	-	Weak-L	-	-	-	-	Moderate-M	Weak-L	-	Weak-L	Moderate-M	Moderate-M

Sr. No	Sem	Course Code	Subject Code	Course Name	CO	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
25	III	701220305	T7512	Programming Paradigms	CO1	Understand various types of programming paradigmes.	Strong-H	Moderate-M	-	-	Moderate-M	-	-	-	-	-	-	-	Moderate-M	-	-
					CO2	Illustrate procedural programming concepts like arrays, type conversion, and control statements and functions.	Strong-H	Moderate-M	-	-	Moderate-M	-	-	-	-	-	-	-	Moderate-M	-	-
					CO3	Develop programs to understand the object oriented programming concepts like classes, objects, static members, friend function, constructors and destructors.	Strong-H	Moderate-M	-	-	Moderate-M	-	-	-	-	-	-	-	Moderate-M	-	-
					CO4	Use advanced concepts of object oriented programming like polymorphism, inheritance and virtual functions in real world examples.	Strong-H	Moderate-M	-	-	Moderate-M	-	-	-	-	-	-	-	Moderate-M	-	-
					CO5	Understand the concepts of declarative programming paradigms through logic programming.	Strong-H	Moderate-M	-	-	Moderate-M	-	-	-	-	-	-	-	Moderate-M	-	-
					CO6	Implement the functional and object oriented concepts using Python	Strong-H	Moderate-M	-	-	Moderate-M	-	-	-	-	-	-	-	Moderate-M	-	-
26	III	701220306	T7513	Programming Paradigms Lab	CO1	Express a problem-solving strategy to breakdown a complex problem into a series of simpler tasks.	Strong-H	Moderate-M	-	-	Moderate-M	-	-	-	-	-	-	-	Moderate-M	-	-
					CO2	Demonstrate the concepts of classes, objects and constructors for problem-solving actions through C++ programs.	Strong-H	Moderate-M	-	-	Moderate-M	-	-	-	-	-	-	-	Moderate-M	-	-
					CO3	Use compile time and run time polymorphism to develop a solution for real world problem.	Strong-H	Moderate-M	-	-	Moderate-M	-	-	-	-	-	-	-	Moderate-M	-	-
					CO4	Demonstrate reusability using different types of inheritance.	Strong-H	Moderate-M	-	-	Moderate-M	-	-	-	-	-	-	-	Moderate-M	-	-
					CO5	Create facts and rules through prolog programs for real life examples	Strong-H	Moderate-M	-	-	Moderate-M	-	-	-	-	-	-	-	Moderate-M	-	-
					CO6	Develop python programs that demonstrates functional and object oriented paradigms.	Strong-H	Moderate-M	-	-	Moderate-M	-	-	-	-	-	-	-	Moderate-M	-	-
27	III	701220307	TE7745	Sensors and Microcontrollers	CO1	Design and implement basic electronic circuits.	Strong-H	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO2	Describe IoT conceptual framework and networking basics.	Strong-H	Moderate-M	-	-	Moderate-M	-	-	-	-	-	-	-	-	-	Weak-L
					CO3	Discuss the working of various sensors used in IoT.	Strong-H	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	-	Weak-L
					CO4	Explain the architecture of Arduino and NodeMCU microcontrollers.	Strong-H	Moderate-M	Moderate-M	-	Moderate-M	-	-	-	-	-	-	-	-	Moderate-M	Moderate-M
					CO5	Interface sensors with microcontrollers and demonstrate IoT-based applications	Strong-H	Moderate-M	Moderate-M	-	Moderate-M	Moderate-M	-	-	Moderate-M	Moderate-M	-	-	-	Moderate-M	Moderate-M
28	III	701220308	TE7746	Sensors and Microcontrollers Lab	CO1	Design and implement basic electronic circuits and measure the electrical parameters.	Strong-H	Moderate-M	Strong-H	-	-	-	-	-	-	-	-	-	Moderate-M	-	-
					CO2	Discuss the working principle of various types of sensors.	Moderate-M	Moderate-M	0	-	-	-	-	-	-	-	-	-	-	0	0
					CO3	Interfacing of sensors with Arduino UNO microcontroller.	Strong-H	Strong-H	Strong-H	-	Moderate-M	-	-	-	-	-	-	-	Moderate-M	Moderate-M	Moderate-M
					CO4	Interfacing of sensors with Node MCU microcontroller.	Strong-H	Strong-H	Strong-H	-	Moderate-M	-	-	-	-	-	-	-	Moderate-M	Moderate-M	Moderate-M
					CO5	Demonstration of cloud platforms in IoT.	Strong-H	Strong-H	Strong-H	-	Moderate-M	-	-	-	-	-	-	-	Moderate-M	-	-
29	III	701220309	T2646	Entrepreneurship Venture	CO1	To familiarize the students with basics of entrepreneurship, its advantages & challenges.	Weak-L	-	-	-	-	Strong-H	-	-	Weak-L	-	-	-	Weak-L	-	-
					CO2	Identify entrepreneurship opportunities and understand various funding means	-	-	-	-	-	Moderate-M	-	-	Weak-L	-	-	Strong-H	Weak-L	-	-
					CO3	Understand the steps to form an organization	-	Weak-L	-	Weak-L	Moderate-M	-	-	-	Moderate-M	-	Strong-H	-	-	-	Moderate-M
					CO4	Create a business and marketing plan	-	Weak-L	Moderate-M	Weak-L	Weak-L	-	-	-	Moderate-M	-	Strong-H	-	-	Moderate-M	-
30	III	701220310	F7045	Agile Software Engineering	CO1	Understand the basics of Software development life cycle	Moderate-M	Moderate-M	Moderate-M	Weak-L	-	-	-	-	-	Weak-L	-	-	-	Moderate-M	-
					CO2	Define Agile Software Engineering and the underlying values, principles, and practices.	Moderate-M	Moderate-M	Moderate-M	Weak-L	-	-	-	-	-	Weak-L	-	-	-	Moderate-M	-
					CO3	Describe agile software project planning, scheduling and estimation	Moderate-M	Moderate-M	Moderate-M	Weak-L	-	-	-	-	-	Weak-L	-	-	-	Moderate-M	-
					CO4	Learn software engineering techniques for requirements elicitation, analysis and documentation.	Moderate-M	Moderate-M	Moderate-M	Weak-L	-	-	-	-	-	Weak-L	-	-	-	Moderate-M	-
					CO5	Understand various agile code development and testing techniques.	Moderate-M	Moderate-M	Moderate-M	Weak-L	-	-	-	-	-	Weak-L	-	-	-	Moderate-M	-
31	III	701220311	T6872	Foundation of Ethics	CO1	To understand the tenets of ethics as a part of daily life	-	-	-	-	-	-	-	Strong-H	Strong-H	-	-	-	-	-	Weak-L
					CO2	To gain knowledge on ethical theories	-	-	-	-	-	-	-	Strong-H	-	-	-	-	Moderate-M	-	Weak-L
					CO3	To reason clearly and precisely about ethical and moral issues in professional life	-	-	-	-	-	-	-	Strong-H	Strong-H	-	-	-	-	-	Weak-L
					CO4	To resolve moral conflicts in professional life	-	-	-	-	-	-	-	Strong-H	Strong-H	-	-	-	-	-	Weak-L
32	IV	701220401	TE7170	Engineering Mathematics-III	CO1	Determine continuity, differentiability and analyticity of a function, evaluate complex integral and find bilinear transform	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO2	Represent the given function in Fourier integral representation, find Fourier transforms and inverse Fourier transforms	Moderate-M	Weak-L	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-
					CO3	Apply Z-transforms to solve difference equations	Moderate-M	Weak-L	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-
					CO4	Describe the nature of partial differential equations and solve partial differential equations	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	-	-
33	IV	701220402	F7054	Object Oriented Programming with Java	CO1	Describe and implement program on the basic concepts of Java programming language.	Moderate-M	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-
					CO2	Apply concepts of inheritance and interface to the given real-world problem.	Moderate-M	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-	-
					CO3	Implement error handling techniques using exception handling.	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	-
					CO4	Demonstrate database connectivity using JDBC.	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	-
					CO5	Explain multithreading and networking concept with RMI and socket programming.	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	-
34	IV	701220403	T7510	Operating Systems	CO1	Demonstrate the understanding of fundamental Operating Systems concepts.	-	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	Moderate-M	-	-
					CO2	Understand the concept of process and thread management and apply the CPU scheduling algorithm to solve problems.	Moderate-M	Strong-H	Strong-H	Moderate-M	-	-	-	-	-	-	-	-	Moderate-M	Moderate-M	Moderate-M
					CO3	Explain and apply the concept of process synchronization, mutual exclusion and the deadlock.	Strong-H	Strong-H	Strong-H	Moderate-M	-	-	-	-	-	-	-	-	Moderate-M	Moderate-M	Moderate-M
					CO4	Discuss various memory management techniques and apply memory page replacement algorithms to solve problems	Strong-H	Strong-H	Strong-H	Moderate-M	-	-	-	-	-	-	Moderate-M	-	Moderate-M	Moderate-M	Moderate-M
					CO5	Understanding of the concepts of file management by Operating System.	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	Moderate-M	-	Moderate-M	-	-
35	IV	701220404	T7511	Operating Systems Lab	CO1	Understand basic concepts of Linux and Fedora Operating System.	Weak-L	Moderate-M	Weak-L	-	Moderate-M	-	-	-	-	Moderate-M	-	-	Moderate-M	Moderate-M	Moderate-M
					CO2	Show how various looping conditional statements can be implemented in Linux Produce results using shell commands using various arithmetic commands for the given	Weak-L	Moderate-M	Moderate-M	-	Moderate-M	-	-	-	-	Moderate-M	-	-	Moderate-M	Moderate-M	Moderate-M
					CO3	Apply the CPU scheduling algorithm to solve the given problems.	Weak-L	Moderate-M	Moderate-M	Weak-L	Moderate-M	-	-	-	-	Moderate-M	-	-	Moderate-M	Moderate-M	Moderate-M
					CO4	Apply the concept of the deadlock.	Weak-L	Moderate-M	Moderate-M	Weak-L	Moderate-M	-	-	-	-	Moderate-M	-	-	Moderate-M	Moderate-M	Moderate-M
					CO5	Demonstrate memory allocation for processes by Page Replacement Algorithm using C program.	Weak-L	Moderate-M	Moderate-M	Weak-L	Moderate-M	-	-	-	-	Moderate-M	-	-	Moderate-M	Moderate-M	Moderate-M
					CO6	Relate File Operations of Linux to basic structure of File Organization of Linux.	Weak-L	Moderate-M	Moderate-M	Weak-L	Moderate-M	-	-	-	-	Moderate-M	-	-	Moderate-M	Moderate-M	Moderate-M
36	IV	701220405	T7907	Database Management Systems	CO1	Demonstrate an understanding of basic database concepts such as DBMS architecture, components, and data models and develop relational schema from E-R model	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	Moderate-M	Weak-L	Moderate-M
					CO2	Construct solutions to a broad range of query problems using relational algebra and Structured Query Language	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	Moderate-M	Moderate-M	Moderate-M
					CO3	Explain database design concepts such as FDDs, anomalies, normalization and apply the same for normalization of databases	Weak-L	Moderate-M	Strong-H	Moderate-M	-	-	-	-	-	-	-	-	Moderate-M	Weak-L	Moderate-M
					CO4	Determine various database organization schemes and prepare query processing plan	Weak-L	Moderate-M	Moderate-M	Strong-H	-	-	-	-	-	-	-	-	Moderate-M	Moderate-M	Moderate-M
					CO5	Examine the working of transaction management schemes and related DB facilities such as concurrency control and locking protocols	Weak-L	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	Moderate-M	Moderate-M	Moderate-M
37	IV	701220406	T7487	Data Base Management Systems Lab	CO1	Design a database schema for a given problem-domain	Weak-L	Moderate-M	Strong-H	-	Moderate-M	-	-	-	-	-	-	-	Moderate-M	Moderate-M	-
					CO2	Use query language to solve given problem.	Moderate-M	Moderate-M	Weak-L	-	Moderate-M	-	-	-	-	-	-	-	Moderate-M	Moderate-M	-
					CO3	Implement the database schema using SQL commands	Weak-L	Moderate-M	Strong-H	-	Moderate-M	-	-	-	-	-	-	-	Moderate-M	Moderate-M	Moderate-M
					CO4	Illustrate the ability to extract the knowledge from the database using SQL queries	Moderate-M	Moderate-M	Moderate-M	-	Moderate-M	-	-	-	-	-	-	-	Moderate-M	Moderate-M	-
					CO5	Compare the performance of PL/SQL functions, procedures and trigger	Moderate-M	Moderate-M	Moderate-M	-	Moderate-M	-	-	-	-	-	-	-	Moderate-M	Strong-H	Moderate-M
38	IV	701220407	TE7290	Project Based Learning -I	CO1	Identify the problem based on societal and research need	-	Strong-H	-	-	-	Moderate-M	Moderate-M	-	Strong-H	-	-	-	Strong-H	Moderate-M	-
					CO2	Apply basic engineering principles and technical skill to devise the solution.	Strong-H	-	Strong-H	Strong-H	Moderate-M	Moderate-M	Moderate-M	-	Strong-H	-	-	-	Strong-H	Strong-H	Strong-H
					CO3	Demonstrate the devised solution using effective written and oral communication.	-	-	-	-	-	-	Strong-H	-	Strong-H	Strong-H	-	-	Strong-H	-	-
					CO4	Develop skills of life-long learning by demonstrating the self-learning in a group.	-	-	-	-	-	-	-	-	Strong-H	-	-	-	Strong-H	-	-
39	IV	701220408	T6184	Basic German I	CO1	Greet & introduce in French language	-	-	-	-	-	-	-	-	-	-	-	-	Moderate-M	Moderate-M	-
					CO2	Form simple sentences and list the numbers as per the French language.	-	-	-	-	-	-	-	-	-	-	-	-	Moderate-M	Moderate-M	-
					CO3	Write the answers in French language.	-	-	-	-	-	-	-	-	-	-	-	-	Moderate-M	Moderate-M	-
					CO4	Communicate in French language.	-	-	-	-	-	-	-	-	-	-	-	-	Moderate-M	Moderate-M	-
40	IV	701220409	T6186	Basic French I	CO1	Greet & introduce in French language	-	-	-	-	-	-	-	-	-	-	-	-	Moderate-M	Moderate-M	-
					CO2	Form simple sentences and list the numbers as per the French language.	-	-	-	-	-	-	-	-	-	-	-	-	Moderate-M	Moderate-M	-
					CO3	Write the answers in French language.	-	-	-	-	-	-	-	-	-	-	-	-	Moderate-M	Moderate-M	-
					CO4	Communicate in French language.	-	-	-	-	-	-	-	-	-	-	-	-	Moderate-M	Moderate-M	-
41	V	701220501	F7046	Introduction to Full Stack Development	CO1	Apply and analyze the basic concept of HTML, CSS, JavaScript, for creating interactive web interface	Moderate-M	Moderate-M	Moderate-M	-	Moderate-M	-	-	-	-	-	-	-	-	Moderate-M	Moderate-M
					CO2	Evaluate validation strategies for forms and user input considering various datatypes and user interactions in both client side and server-side context	Moderate-M	Strong-H	Moderate-M	-	Moderate-M	-	-	-	-	-	-	-	-	Moderate-M	Moderate-M
					CO3	Implement database connectivity with frontend in web application	Moderate-M	Strong-H	Moderate-M	-	Moderate-M	-	-	-	-	-	-	-	-	Moderate-M	Moderate-M
					CO4	Develop a web application for real-world problems with concept of node.js and react.js.	Strong-H	Strong-H	Strong-H	-	Strong-H	-	-	-	-	Strong-H	Strong-H	Strong-H	Strong-H	Strong-H	Strong-H
42	V	701220502	T8000	Service Learning	CO1	To promote learning through active participation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO2	To provide structured time to students to think, discuss and implement from their past experiences	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	Strong-H	Moderate-M	-	Moderate-M	-
					CO3	To apply their skills and knowledge beyond the classroom in real life situations	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	Moderate-M
					CO4	To stimulate sense of caring in students	Moderate-M	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	Strong-H	-	-	Moderate-M	Moderate-M
43	V	701220503	T7908	Computer Networks	CO1	Explain computer network concepts and network models.	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	Weak-L	Weak-L
					CO2	Describe physical layer functions and data link layer protocols.	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	Weak-L	Weak-L
					CO3	Classify IP addressing and explain protocols at network layer and transport layer.	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	Weak-L	Weak-L
					CO4	Implement application layer protocols.	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	Weak-L	Weak-L
44	V	701220504	T7482	Computer Networks Lab	CO1	Explain the networking devices.	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	Weak-L	Weak-L
					CO2	Analyze application layer protocols by packet tracer tool.	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	Weak-L	Weak-L
					CO3	Analyze packet capturing of various protocols by using Wireshark tool.	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	Weak-L	Weak-L
					CO4	Simulate network optimization and traffic shaping algorithms.	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	Weak-L	Weak-L
45	V	701220505	T7907	Database Management Systems	CO1	Demonstrate an understanding of basic database concepts such as DBMS architecture, components, and data models and develop relational schema from E-R model	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	Moderate-M	Weak-L	Moderate-M
					CO2	Construct solutions to a broad range of query problems using relational algebra and Structured Query Language	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	Moderate-M	Moderate-M	Moderate-M
					CO3	Explain database design concepts such as FDDs, anomalies, normalization and apply the same for normalization of databases	Weak-L	Moderate-M	Strong-H	Moderate-M	-	-	-	-	-	-	-	-	Moderate-M	Weak-L	Moderate-M
					CO4	Determine various database organization schemes and prepare query processing plan	Weak-L	Moderate-M	Moderate-M	Strong-H	-	-	-	-	-	-	-	-	Moderate-M	Moderate-M	Moderate-M
					CO5	Examine the working of transaction management schemes and related DB facilities such as concurrency control and locking protocols	Weak-L	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	Moderate-M	Moderate-M	Moderate-M
					CO1	Design a database schema for a given problem-domain.	Weak-L	Moderate-M	Strong-H	-	Moderate-M	-	-	-	-	-	-	-	Moderate-M	Moderate-M	Moderate-M
					CO2	Use query language to solve given problem.	Moderate-M	Moderate-M	Weak-L	-	Moderate-M	-	-	-	-	-	-	-	Moderate-M	Moderate-M	Moderate-M

No	Sem	Code	Code2	Course	CO	Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
46	V	701220506	T7487	Database Management Systems Lab	CO3	Implement the database schema using SQL commands	Weak-L	Moderate-M	Strong-H	-	Moderate-M	-	-	-	-	Moderate-M		Moderate-M	Moderate-M	Moderate-M	
					CO4	Illustrate the ability to extract the knowledge from the database using SQL queries.	Weak-L	Moderate-M	Moderate-M	-	Moderate-M	-	-	-	-	Moderate-M		Moderate-M	Moderate-M	Moderate-M	
					CO5	Compare the performance of PL/SQL functions, procedures and trigger.	Moderate-M	Moderate-M	Moderate-M	-	Moderate-M	-	-	-	-	Moderate-M		Moderate-M	Moderate-M	Moderate-M	
47	V	701220507	TE7299	Theory of Computation	CO1	Illustrate automata theory, its types and inter conversions like Deterministic Finite Automata (DFA), Non-Deterministic Finite Automata (NFA) and e-NFA.	Strong-H	Strong-H	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO2	Identify Regular Expressions (RE) and Regular Languages.	Strong-H	Strong-H	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO3	Analyze Context Free Grammar (CFG), different derivations, conversions and properties.	Strong-H	Strong-H	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO4	Relate Push Down Automata (PDA) to Context Free Grammar.	Strong-H	Strong-H	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO5	Understand and design Turing Machine and calculate computability and complexity.	Strong-H	Strong-H	-	-	-	-	-	-	-	Moderate-M	-	-	-	-	-
48	V	701220508	T6774	Principles of Economics	CO1	The objective of the course is to explain the students to the most important and basic principles of economics	-	-	-	-	-	Moderate-M	-	-	-	-	Moderate-M	-	-	-	-
					CO2	The course will enable students to look at the behavior of individuals and institutions involved in the consumption, production and exchange of goods and services.	-	-	-	-	-	Weak-L	-	-	-	-	Moderate-M	-	-	-	-
					CO3	The course is designed to improve critical thinking, problem solving skills by using economic models and theories. Thus, the course aims to provide a comprehensive coverage of fundamental principles of economics that would enable students to be more effective decision makers in the sphere of economic activities.	-	-	-	-	-	Weak-L	-	-	-	-	Moderate-M	Moderate-M	-	-	-
					CO4	Students entering any profession in the workforce today must be able to utilize these basic economic principles. Students with solid understanding of the basic theories can start thinking like an economist; understand the current topics in economics. This will enable them to formulate their own opinions on various economic issues.	-	-	-	-	-	Weak-L	-	-	-	-	Moderate-M	Moderate-M	-	-	-
49	V	701220516	TE7263	Introduction to AI and Machine Learning	CO1	To Understand the basic concept of AI and ML and their applications	Strong-H	Strong-H	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO2	Interpret and apply ML related techniques.	Strong-H	Strong-H	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO3	Design the machine learning model and analyses the techniques on the basis of Evaluation metrics	Strong-H	Strong-H	-	-	-	-	-	-	-	-	-	-	-	-	-
					CO4	Evaluate and Analyze various AI and ML techniques to real world applications.	Strong-H	Strong-H	-	-	-	-	-	-	-	-	-	-	-	-	-
50	V	701220517	TE7265	Introduction to Data Science	CO1	Proficient in applying key data science concepts.	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-	Weak-L	Weak-L
					CO2	Use of R language to carry out basic statistical modeling and analysis.	Weak-L	Moderate-M	Weak-L	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	Weak-L	Moderate-M
					CO3	Capable of recognizing the importance of exploratory data analysis (EDA) in data science and proficient in utilizing various tools to perform EDA effectively.	Weak-L	Moderate-M	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	Moderate-M	Moderate-M
					CO4	Apply basic machine learning algorithms for predictive modeling.	Weak-L	Moderate-M	Moderate-M	Weak-L	Weak-L	-	-	-	-	-	-	-	-	Moderate-M	Moderate-M
					CO5	Create effective visualization of given data.			Weak-L	Weak-L	Moderate-M	-	-	-	-	-	-	-	-	Weak-L	Moderate-M
					CO6	Intrepret ethical and privacy issues in data science conduct.		Weak-L	Weak-L	Weak-L	-	-	-	Weak-L	-	-	-	-	Moderate-M	Moderate-M	Weak-L
51	VI	701220601	TE7008	Distributed Systems and Resource Management	CO1	Sketch the architecture of the multicomputer models and the different design issues.	Strong-H	Weak-L	Weak-L	Weak-L	Moderate-M	-	-	Weak-L	-	Moderate-M	Weak-L	Moderate-M	Moderate-M	-
					CO2	Implement the clock synchronization algorithms in distributed system.	Strong-H	Moderate-M	Weak-L	Weak-L	Moderate-M	-	-	Weak-L	-	Moderate-M	Weak-L	Moderate-M	Moderate-M	-
					CO3	Execute the deadlock detection techniques for the different resource and communication model.	Strong-H	Moderate-M	Weak-L	Weak-L	-	-	-	Weak-L	-	Moderate-M	Weak-L	Strong-H	Moderate-M	-
					CO4	Use the recovery techniques of the single processor system, solving the recovery problems in distributed environment	Strong-H	Moderate-M	Weak-L	Weak-L	Moderate-M	-	-	Weak-L	-	Moderate-M	Weak-L	Moderate-M	Moderate-M	-
					CO5	Execute the shared memory solutions to build a coherent system in distributed environment	Strong-H	Strong-H	Weak-L	Weak-L	Moderate-M	-	-	Weak-L	-	Moderate-M	Weak-L	Moderate-M	Moderate-M	-
					CO6	Demonstrate the working of a distributed file system with HDFS.	Strong-H	Strong-H	Weak-L	Weak-L	Moderate-M	-	-	Weak-L	-	Moderate-M	Weak-L	Moderate-M	Moderate-M	-
52	VI	701220602	F7053	Web and Mobile Application Development	CO1	Apply technologies of ReactJS to create interactive website.	Strong-H	Moderate-M	Weak-L	Moderate-M	Strong-H	-	-	-	Moderate-M	Moderate-M	-	-	Strong-H	Strong-H
					CO2	Develop and sketch an application using responsive web.	Strong-H	Strong-H	Strong-H	Moderate-M	Strong-H	-	-	-	Moderate-M	Moderate-M	-	-	Strong-H	Strong-H
					CO3	Develop UI based environments suitable for mobile and desktop application.	Moderate-M	Moderate-M	Moderate-M	Moderate-M	Strong-H	-	-	-	Moderate-M	Moderate-M	-	-	Strong-H	Strong-H
					CO4	Apply the backend database connectivity for developed application.	Strong-H	Strong-H	Moderate-M	Moderate-M	Strong-H	-	-	-	Moderate-M	Moderate-M	-	-	Strong-H	Strong-H
					CO5	Use the security aspects in developed applications.	Strong-H	Strong-H	Moderate-M	Moderate-M	Strong-H	-	-	-	Moderate-M	Moderate-M	-	-	Strong-H	Strong-H
53	VI	701220603	T6749	Design Thinking	CO1	To understand and apply design thinking approach, best practices & nuances, and global scenario for innovation & entrepreneurship.	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	Moderate-M	-
					CO2	To learn & develop mindset, attitude, and 21st-century skills as problem solvers and innovators needed by professionals nowadays.	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	Moderate-M	-
					CO3	To observe and investigate the real and hidden needs of the user for complex problem scenarios and analyze and synthesize the research data to define correct and final problem statements.	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	Moderate-M	-
					CO4	To Evaluate the ideas and create a prototyping and iterative mindset for successful product development.	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	Moderate-M	-
54	VI	701220604	TE7291	PBL - II	CO1	Identify the problem based on societal and research need.	Strong-H	Strong-H	Strong-H	Strong-H	Moderate-M	-	-	Strong-H	Strong-H	Strong-H	-	Strong-H	Strong-H	Strong-H
					CO2	Apply the current technology and technical skill to devise the solution.	Strong-H	Strong-H	Strong-H	Strong-H	Strong-H	-	-	Strong-H	Strong-H	Strong-H	-	Strong-H	Strong-H	Strong-H
					CO3	Demonstrate the devised solution using effective written and oral communication.	Moderate-M	Moderate-M	Moderate-M	-	Moderate-M	-	-	Strong-H	Strong-H	Strong-H	-	Strong-H	Strong-H	Strong-H
					CO4	Develop skills of life-long learning by demonstrating the self-learning in a group	Strong-H	Strong-H	Moderate-M	Strong-H	-	-	-	Strong-H	Strong-H	Strong-H	-	Strong-H	Strong-H	Strong-H
					CO5	Develop the application / file a Patent / International Publications.	Strong-H	Strong-H	Strong-H	-	Moderate-M	-	-	Strong-H	Strong-H	Strong-H	-	Strong-H	Strong-H	Strong-H
55	VI	701220605	T7802	Capstone Course	CO1	Discuss the core theories and concepts	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	Moderate-M	-
					CO2	Solve coding problems related to core technical concepts	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	Moderate-M	-
					CO3	Apply the fundamental technical knowledge for problem solving	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	Moderate-M	-
					CO4	Explore technical ideas and case-studies	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	Moderate-M	-
56	VI	701220606	T2585	Organizational Behaviour	CO1	Describe how behaviour affects the organizational performance and effectiveness	Strong-H	Weak-L	Weak-L	Weak-L	Moderate-M	-	-	Weak-L	-	Moderate-M	Weak-L	Moderate-M	Moderate-M	-
					CO2	Identify the factors affecting individual behaviour at work place	Strong-H	Weak-L	Weak-L	Weak-L	Moderate-M	-	-	Weak-L	-	Moderate-M	Weak-L	Moderate-M	Moderate-M	-
					CO3	Demonstrate the importance of team dynamics in organizations	Strong-H	Moderate-M	Weak-L	Weak-L	-	-	-	Weak-L	-	Moderate-M	Weak-L	Strong-H	Moderate-M	-
					CO4	Appreciate the differences in organizational cultural values.	Strong-H	Moderate-M	Weak-L	Weak-L	Moderate-M	-	-	Weak-L	-	Moderate-M	Weak-L	Moderate-M	Moderate-M	-
					CO5	Distinguish between the characteristics of managers and leaders.	Strong-H	Strong-H	Weak-L	Weak-L	Moderate-M	-	-	Weak-L	-	Moderate-M	Weak-L	Moderate-M	Moderate-M	-
57	VI	701220608	TE7255	Dataware Housing and Mining	CO1	Outline and organize architecture of data warehouse and its components.	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	Moderate-M	Moderate-M	-	-	Moderate-M	Moderate-M
					CO2	Illustrate data mining concepts and algorithms.	-	-	-	-	Strong-H	-	-	-	Moderate-M	Moderate-M	-	-	-	Strong-H
					CO3	Analyze multidimensional data using "Online Analytical Processing" tool.	Moderate-M	-	-	Moderate-M	-	-	-	-	Moderate-M	Moderate-M	-	Moderate-M	-	Strong-H
					CO4	Experiment how to produce a quantitative analysis report/memo with the necessary information to make decisions.	-	-	-	Moderate-M	Strong-H	-	-	-	Moderate-M	Moderate-M	-	Moderate-M	-	Strong-H
					CO5	Demonstrate basic data mining algorithms, methods, and tool.	-	-	-	Moderate-M	Strong-H	-	-	-	Moderate-M	Moderate-M	-	Moderate-M	Moderate-M	Strong-H
					CO6	Test and compare different data mining algorithms such as A-priori, Decision Tree Classifier, K-means clustering.	-	-	-	Moderate-M	-	-	-	-	Moderate-M	Moderate-M	-	-	-	Strong-H
58	VI	701220609	TE7101	Internet of Things	CO1	Learn and explore the basics of networking.	Moderate-M	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-
					CO2	Experience data collection from sensors using microcontroller device.	Moderate-M	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-
					CO3	Demonstrate understanding on CoAP and MQTT protocols.	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-
					CO4	Develop clear understanding on IoT Cloud integration .	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-
					CO5	Explore on IoT privacy issue and Block chain.	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-
59	VI	701220610	TE7328	Image Processing	CO1	Understand of basic concepts of two-dimensional signal acquisition, sampling, and quantization.	Strong-H	Weak-L	-	-	-	-	-	-	-	-	-	-	Strong-H	Weak-L
					CO2	Understand the fundamental image manipulations such as histogram stretching, histogram equalization, contrast enhancement, log transforms and image negatives, and spatial filtering techniques.	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	Strong-H	Weak-L
					CO3	Understand the 2D Fourier transform, 2D FFT, and filtering images in the Fourier domain.	Strong-H	Moderate-M	-	-	-	-	-	-	-	-	-	-	Strong-H	Weak-L
					CO4	Understand the image morphology that includes image manipulation using set theory.	Strong-H	Moderate-M	-	-	-	-	-	-	-	-	-	-	Strong-H	Weak-L
					CO5	Understand concepts in image segmentation.	Strong-H	Weak-L	-	-	-	-	-	-	-	-	-	-	Strong-H	Weak-L
					CO6	Describe the basic issues and the scope of image processing, and the roles of image processing and systems in a variety of applications.	Strong-H	Moderate-M	Moderate-M	Weak-L	Weak-L	-	-	-	-	-	-	-	Strong-H	Weak-L
60	VI	701220614	T7473	Artificial Intelligence	CO1	Explain definition, goals and applications of Artificial Intelligence (AI) with examples	Moderate-M	Moderate-M	Strong-H	-	-	-	-	-	Moderate-M	Strong-H	-	Moderate-M	Moderate-M	Moderate-M
					CO2	Evaluate solving problems in AI by various search and planning techniques	Strong-H	Strong-H	Moderate-M	-	-	-	-	-	Moderate-M	Strong-H	-	Moderate-M	Moderate-M	Moderate-M
					CO3	Illustrate various properties of knowledge representation in AI using various AI techniques	Strong-H	Strong-H		-	-	-	-	-	Moderate-M	Strong-H	-	Moderate-M	Moderate-M	Moderate-M
					CO4	Discuss Natural Language Processing (NLP) techniques in various AI applications	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	Moderate-M	Strong-H	-	Moderate-M	Moderate-M	Moderate-M
					CO5	Illustrate the architecture of Expert System for various AI applications	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	Moderate-M	Strong-H	-	Moderate-M	Moderate-M	Moderate-M
61	VI	701220615	TE7259	Human Computer Interface	CO1	Analyze the role of user in information Systems.	Moderate-M	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-
					CO2	Examine different models in development of an interface such as Cognitive model, Linguistic model.	Moderate-M	Moderate-M	Weak-L	-	-	-	-	-	-	-	-	-	-	-
					CO3	Outline the phases of designing user-friendly interface using LUCID development methodology.	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-
					CO4	Categorize various documentation like CSCW, Web Presentation required to build and use a user-friendly interface.	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-
					CO5	Explore new modes of Human Computer Interaction (HCI) using voice, gesture, eye movement.	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	-	-
62	VI	701220616	TE7243	Advanced Algorithms	CO1	Analyze, compare and design better algorithms using algorithm design strategies.	Strong-H	Strong-H	Strong-H	Strong-H	-	-	-	-	-	-	-	-	-	-
					CO2	Derive recurrence equations for recursive algorithms and apply methodologies to solve recurrences and analyze the algorithms.	Strong-H	Strong-H	Strong-H	Strong-H	-	-	-	-	-	-	-	-	-	-
					CO3	Analyze advanced algorithms for solving many real-life problems using Graph data structures.	Strong-H	Strong-H	Strong-H	Strong-H	-	-	-	-	-	-	-	-	-	-
					CO4	Design optimized algorithms for parallel machines (multiple processors) toprovide real-time solutions to real-time problems.	Strong-H	Strong-H	Strong-H	Strong-H	-	-	-	-	-	-	-	-	-	-
					CO5	Design approximation algorithms to solve NP-hard optimization problems.	Strong-H	Strong-H	Strong-H	Strong-H	-	-	-	-	-	-	-	-	-	-
63	VI	701220628	TE7264	Introduction to Big Data	CO1	Describe big data and its importance	Moderate-M	Weak-L	-	-	Weak-L	-	-	-	-	-	-	-	-	-
					CO2	Compare MapReduce-1 and MapReduce-2 frameworks for solving Big data problems	Moderate-M	Moderate-M	-	-	Weak-L	-	-	-	-	-	-	-	-	-
					CO3	Differentiate Hive and RDBMS	Moderate-M	Moderate-M	-	-	Weak-L	-	-	-	-	-	-	-	-	-
					CO4	Apply the technologies Pig for big data analytics	Moderate-M	Moderate-M	-	-	Weak-L	-	-	-	-	-	-	-	-	-
					CO5	Apply the technology Hive for Big data analytics	Moderate-M	Moderate-M	-	-	Weak-L	-	-	-	-	-	-	-	-	-
					CO6	Analyze Query execution performance with in-memory databases like Apache Spark	Moderate-M	Moderate-M	-	-	Weak-L	-	-	-	-	-	-	-	-	-
64	VI	701220623	TE7756	Open Source Tools	CO1	Relate to the idea of adoption of Open Source Software (OSS) and Public Domain Software (PDS) in software development process.	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	Moderate-M	-
					CO2	Identify and outline the need for licenses and patents.	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	Moderate-M	-
					CO3	Analyze the basic idea of open source technology, their software development	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	Moderate-M	-
					CO4	Examine and analyze various open source software and tools,Outline and distinguish between open source and closed source technologies.	Moderate-M	Moderate-M	Moderate-M	-	-	-	-	-	-	-	-	-	Moderate-M	-
					CO5	Outline and distinguish between open source and closed source technologies.	Moderate-M	-	-	-	-	-	-	-	-	-	-	-	Moderate-M	-
65	VI	701220611	TE7013	Dataware Housing and Mining Lab	CO1	Analyze multidimensional data using "Online Analytical Processing" tool	-	-	Strong-H	Strong-H	Strong-H	-	-	-	Strong-H	Strong-H	-	Strong-H	Strong-H	Strong-H
					CO2	Apply different data pre-processing steps on a data set	Moderate-M	-	Strong-H	Strong-H	-	-	-	-	Strong-H	Strong-H	-	Strong-H	Strong-H	Strong-H
					CO3	Experiment how to produce a quantitative analysis report/memo with the necessary information to make decisions	Moderate-M	-	-	Strong-H	-	-	-	-	Strong-H	Strong-H	-	Strong-H	Strong-H	Strong-H

Sr No	Sem	Course Code	Subject Code	Subject	CO	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
					CO4	Demonstrate basic data mining algorithms, methods, and tool	Moderate-M	-	Strong-H	-	Strong-H	-	-	-	Strong-H	Strong-H	-	Strong-H	Strong-H	Strong-H
					CO5	Test and compare different data mining algorithms such as A-priori, Decision Tree Classifier, K-means clustering	Strong-H	-	Moderate-M	Strong-H	-	-	-	-	Strong-H	Strong-H	-	Moderate-M	Strong-H	Strong-H
66	VI	701220612	TE7262	Internet of Things Lab	CO1	To experiment and understand the basics of embedded microcontroller and sensors.	Moderate-M	Moderate-M	Moderate-M	Moderate-M	Strong-H	-	-	-	Strong-H	Strong-H	-	Strong-H	Strong-H	Strong-H
					CO2	To experiment and understand the interfacing of sensors using GPIO, SPI with Embedded microcontroller.	Moderate-M	Moderate-M	Moderate-M	Moderate-M	Strong-H	-	-	-	Strong-H	Strong-H	-	Strong-H	Strong-H	Strong-H
					CO3	To learn and express your understanding of local data storage and data storage on a remote server.	Moderate-M	Moderate-M	Moderate-M	Moderate-M	Strong-H	-	-	-	Strong-H	Strong-H	Strong-H	Strong-H	Strong-H	Strong-H
					CO4	Express your understanding of messaging protocols such as COAP, and MQTT.	Moderate-M	Moderate-M	Moderate-M	Moderate-M	Strong-H	-	-	-	Strong-H	Strong-H	-	Strong-H	Strong-H	Strong-H
					CO5	To synthesize your understanding and develop a farm of communicating base stations.	Moderate-M	Moderate-M	Moderate-M	Moderate-M	Strong-H	Strong-H	-	-	Strong-H	Strong-H	Strong-H	Strong-H	Strong-H	Strong-H
67	VI	701220613	TE7329	Image Processing Lab	CO1	Demonstrate understanding of basic concepts of two-dimensional signal acquisition, sampling and quantization.	Strong-H	Weak-L	-	-	-	-	-	-	-	-	-	-	Strong-H	Weak-L
					CO2	Demonstrate understanding of fundamental image manipulations such as histogram stretching, histogram equalization, contrast enhancement, log transforms and image negatives, and spatial filtering techniques.	Strong-H	Moderate-M	-	-	-	-	-	-	-	-	-	-	Strong-H	Weak-L
					CO3	Demonstrate understanding of 2D Fourier transform, 2D FFT and filtering images in Fourier domain.	Strong-H	Moderate-M	-	-	-	-	-	-	-	-	-	-	Strong-H	Weak-L
					CO4	Demonstrate understanding of image morphology that includes image manipulation using set theory.	Strong-H	Moderate-M	-	-	-	-	-	-	-	-	-	-	Strong-H	Weak-L
					CO5	Understand concepts in image segmentation.	Strong-H	Weak-L	-	-	-	-	-	-	-	-	-	-	Strong-H	Weak-L
					CO6	Describe the basic issues and the scope of image processing, and the roles of image processing and systems in a variety of applications	Strong-H	Moderate-M	Moderate-M	Weak-L	Weak-L	-	-	-	-	-	-	-	Strong-H	Weak-L
68	VI	701220617	TE7014	Artificial Intelligence Lab	CO1	To acquire a comprehensive understanding of fundamental AI concepts	Moderate-M	Weak-L	Moderate-M	-	Moderate-M	-	-	-	Strong-H	Moderate-M	-	-	Strong-H	Strong-H
					CO2	To explore various AI problem solving and knowledge representation techniques	Moderate-M	Moderate-M	Moderate-M	-	Moderate-M	-	-	-	Strong-H	Moderate-M	-	-	Strong-H	Strong-H
					CO3	To perform various AI- based text preprocessing techniques for NLP applications	Moderate-M	Strong-H	Moderate-M	Weak-L	Moderate-M	-	-	-	Strong-H	Moderate-M	-	-	Strong-H	Strong-H
					CO4	To implement AI algorithms for NLP applications	Moderate-M	Strong-H	Moderate-M	Weak-L	Moderate-M	-	-	-	Strong-H	Moderate-M	-	-	Strong-H	Strong-H
69	VI	701220618	TE7260	Human Computer Interface Lab	CO1	Understand the concept of User interface for particular use case.	Strong-H	Strong-H	Weak-L	-	-	-	-	-	-	-	-	-	-	-
					CO2	Explore the design prototyping for user interface.	Strong-H	Strong-H	Weak-L	-	-	-	-	-	-	-	-	-	-	-
					CO3	Design user-friendly interface using LUCID development methodology.	Moderate-M	Strong-H	Moderate-M	-	-	-	-	-	-	-	-	-	-	-
					CO4	Evaluate the different design solutions & build powerful interface.	Strong-H	Strong-H	Strong-H	-	-	-	-	-	-	-	-	-	-	-
					CO5	Demonstrate the UI/UX process in form of Documents.	Strong-H	Strong-H	Strong-H	-	-	-	-	-	-	-	-	-	-	-
70	VII	701220619	TE7244	Advanced Algorithms Lab	CO1	Analyze, compare and design better algorithms using algorithm design strategies.	Strong-H	Strong-H	Strong-H	Strong-H	-	-	-	-	-	Moderate-M	-	Moderate-M	Moderate-M	Moderate-M
					CO2	Derive recurrence equations for recursive algorithms and apply methodologies to solve recurrences and analyze the algorithms.	Strong-H	Strong-H	Strong-H	Strong-H	-	-	-	-	-	Moderate-M	-	Moderate-M	Moderate-M	Moderate-M
					CO3	Analyze algorithms for solving problems using Graph data structures.	Strong-H	Strong-H	Strong-H	-	-	-	-	-	-	Moderate-M	-	Moderate-M	Moderate-M	Moderate-M
					CO4	Analyze optimized algorithms for parallel machines (multiple processors).	Strong-H	Strong-H	Strong-H	Strong-H	-	-	-	-	-	Moderate-M	-	Moderate-M	Moderate-M	Moderate-M
					CO5	Design approximation algorithms to solve NP-hard optimization problems.	Strong-H	Strong-H	Strong-H	Strong-H	-	-	-	-	-	Moderate-M	-	Moderate-M	Moderate-M	Moderate-M
71	VII	701220701	T7804	B.Tech Project	CO1	Identify and summarize an appropriate list of literature review, analyse previous researchers' work and relate them to current project	Strong-H	Strong-H	Strong-H	Strong-H	Medium-M	Low-L	Low-L	Medium-M	Strong-H	Strong-H	Low-L	Strong-H	Medium-M	Medium-M
					CO2	Design engineering solutions to complex problems utilising a systems approach.	Strong-H	Strong-H	Strong-H	Strong-H	Medium-M	Low-L	Low-L	Medium-M	Strong-H	Strong-H	Low-L	Strong-H	Medium-M	Medium-M
					CO3	Demonstrate a sound technical knowledge of their selected project topic.	Strong-H	Strong-H	Strong-H	Strong-H	Medium-M	Low-L	Low-L	Medium-M	Strong-H	Strong-H	Low-L	Strong-H	Medium-M	Medium-M
					CO4	Present the project outline and expected results using good oral and written presentation skills.	Strong-H	Strong-H	Strong-H	Strong-H	Medium-M	Low-L	Low-L	Medium-M	Strong-H	Strong-H	Low-L	Strong-H	Medium-M	Medium-M
					CO5	Organise, record and compile work done throughout the project	Strong-H	Strong-H	Strong-H	Strong-H	Medium-M	Low-L	Low-L	Medium-M	Strong-H	Strong-H	Low-L	Strong-H	Medium-M	Medium-M
72	VII	701220702	TE7751	Compiler Construction	CO1	Comprehensive understanding of the compilation process and its key stages.	Strong-H	Strong-H	-	-	-	-	-	-	-	-	-	-	-	-
					CO2	Perform syntax analysis through examples based on approaches	Strong-H	Strong-H	-	-	-	-	-	-	-	-	-	-	-	-
					CO3	Perform syntax directed translation using attributes and their evaluation methods.	Strong-H	Strong-H	-	-	-	-	-	-	-	-	-	-	-	-
					CO4	Explain runtime storage organization and related approaches.	Strong-H	Strong-H	-	-	-	-	-	-	-	-	-	-	-	-
					CO5	Perform intermediate code generation using different programming constructs.	Strong-H	Strong-H	-	-	-	-	-	-	-	-	-	-	-	-
					CO6	Understand code generation in terms of issues, simple and dynamic code generator, able to discuss optimization types, flow graph analysis and transformation.	Strong-H	Strong-H	-	-	-	-	-	-	-	-	-	-	-	-
73	VII	701220704	F0003	Big data, Hadoop & Apache Spark (Flexi course)	CO1	Differentiate structured and unstructured data stores and apply software tools for big data analytics.	Strong-H	Strong-H	Strong-H	Medium-M	Strong-H	-	-	-	-	-	-	-	Medium-M	-
					CO2	Apply Big Data Solutions using Hadoop EcoSystem.	Strong-H	Strong-H	Strong-H	Medium-M	Strong-H	-	-	-	-	-	-	-	Strong-H	-
					CO3	Apply relational data in a Hadoop environment, using Hive and Pig tools of the Hadoop Ecosystem.	Strong-H	Strong-H	Strong-H	Medium-M	Strong-H	-	-	-	-	-	-	-	Strong-H	-
					CO4	Demonstration of Spark and machine learning algorithms.	Strong-H	Strong-H	Strong-H	Strong-H	Strong-H	-	-	-	-	-	-	-	Strong-H	-
74	VII	701220703	T7478	Compiler Construction Lab	CO1	Analyze working mechanism of LEX and YACC, with all type of expression	Medium-M	Low-L	Medium-M	-	-	-	-	-	-	-	-	-	-	-
					CO2	Identify inter operation of LEX and YACC for expression evaluation	Strong-H	Low-L	Strong-H	-	-	-	-	-	-	-	-	-	-	-
					CO3	Test LEX and YACC interoperation for error recovery	Medium-M	Low-L	Medium-M	-	-	-	-	-	-	-	-	-	-	-
					CO4	Examine YACC for looping constructs	Medium-M	Low-L	Medium-M	-	-	-	-	-	-	-	-	-	-	-
					CO5	Analyze Intermediate codes through YACC	Medium-M	Low-L	Medium-M	-	-	-	-	-	-	-	-	-	-	-
75	VII	701220705	T7674	Cyber Security	CO1	Understand threats models and different cyber security terms used at National and International level.	-	Medium-M	-	Medium-M	-	Strong-H	Medium-M	Strong-H	-	-	-	-	Medium-M	Medium-M
					CO2	Inter National and International cyber laws and various sections, amendments under them	-	-	-	-	-	Strong-H	Medium-M	Strong-H	-	-	-	-	Medium-M	Medium-M
					CO3	Infer and compare the implemented management practices by various organizations in the cyber security domain.	-	Medium-M	-	-	-	Strong-H	Medium-M	Strong-H	-	-	-	-	Medium-M	Medium-M
					CO4	Identify existing problems in the cyber world and propose solutions for the problem.	-	Medium-M	-	-	-	Strong-H	Medium-M	Strong-H	-	-	-	-	Medium-M	Medium-M
76	VII	701220707	TE7253	Data Science (Generic Elective)	CO1	Proficient in applying key data science concepts.	Strong-H	Medium-M	Strong-H	Medium-M	Medium-M	-	-	-	-	-	-	Medium-M	-	Medium-M
					CO2	Use of R language to carry out basic statistical modeling and analysis.	Medium-M	Strong-H	Medium-M	Medium-M	Medium-M	-	-	-	-	-	-	Medium-M	-	Medium-M
					CO3	Capable of recognizing the importance of exploratory data analysis (EDA) in data science and proficient in utilizing various tools to perform EDA effectively.	Medium-M	Medium-M	Medium-M	Strong-H	Medium-M	-	-	-	-	-	-	Medium-M	Medium-M	Medium-M
					CO4	Apply basic machine learning algorithms for predictive modeling.	Medium-M	Medium-M	Medium-M	Strong-H	Medium-M	-	-	-	-	-	-	Medium-M	Medium-M	Medium-M
					CO5	Create effective visualization of given data.	Medium-M	Strong-H	Strong-H	Medium-M	Medium-M	-	-	-	-	-	-	Medium-M	Medium-M	Medium-M
					CO6	Intrepret ethical and privacy issues in data science conduct.	-	-	-	-	-	-	-	-	Strong-H	-	-	Medium-M	Medium-M	Medium-M
77	VII	701220709	TE7097	Neural Network	CO1	Outline the basic concepts of Neural Networks (NN).	Strong-H	Medium-M	-	-	Strong-H	-	-	-	Medium-M	-	-	Strong-H	Strong-H	Strong-H
					CO2	Apply various NN learning processes and rules. Design and implement applications of Neural Networks (NN) in different sectors such as manufacturing, finance, medical etc.	Strong-H	Medium-M	Medium-M	Medium-M	Strong-H	-	-	-	Medium-M	Strong-H	-	Strong-H	Strong-H	Strong-H
					CO3	Sketch and use various Perceptron Models & Networks.	Strong-H	Strong-H	Strong-H	Strong-H	Strong-H	-	-	-	Strong-H	Strong-H	-	Strong-H	Strong-H	Strong-H
					CO4	Apply multilayer perceptron models in real life concepts.	Strong-H	Strong-H	Medium-M	Medium-M	Strong-H	-	-	-	Strong-H	Strong-H	-	Strong-H	Strong-H	Strong-H
					CO5	Implement and use NN theorems, models and learning techniques.	Strong-H	-	Strong-H	Strong-H	Strong-H	-	-	-	Strong-H	Strong-H	-	Strong-H	Strong-H	Strong-H
78	VII	701220710	TE7112	Neural Network Lab	CO1	Implement the McCulloch and Pitt's Neuron model	Strong-H	Strong-H	Strong-H	Strong-H	Medium-M	-	-	-	Strong-H	Strong-H	-	Strong-H	Medium-M	Strong-H
					CO2	Implement and compare the ANN learning rules	Strong-H	Strong-H	Strong-H	Strong-H	Medium-M	-	-	-	Strong-H	Strong-H	-	Strong-H	Medium-M	Strong-H
					CO3	Implement perceptron models	Strong-H	Strong-H	Strong-H	Strong-H	Medium-M	-	-	-	Strong-H	Strong-H	-	Strong-H	Medium-M	Strong-H
					CO4	Apply neural network theorems in models	Strong-H	Strong-H	Strong-H	Strong-H	Medium-M	-	-	-	Strong-H	Strong-H	-	Strong-H	Medium-M	Strong-H
					CO5	Implement BPNN & Hamming model	Strong-H	Strong-H	Strong-H	Strong-H	Medium-M	-	-	-	Strong-H	Strong-H	-	Strong-H	Medium-M	Strong-H
					CO6	Develop the neural network theorems and models in projects	Strong-H	Strong-H	Strong-H	Strong-H	Medium-M	-	-	-	Strong-H	Strong-H	-	Strong-H	Medium-M	Strong-H
79	VII	701220712	TE7254	Data Science Lab (Generic Elective)	CO1	Demonstrate implementation of statistical programming concepts in R	Medium-M	Medium-M	-	-	Medium-M	-	-	-	-	-	-	Medium-M	-	Medium-M
					CO2	Demonstrate the application of R package for advanced statistical analysis	Medium-M	Low-L	Medium-M	-	Medium-M	-	-	-	-	-	-	Medium-M	Medium-M	Medium-M
					CO3	Predicting and analysing the problems involved building models to make predictions about future events or outcomes of regression techniques.	Low-L	Medium-M	Medium-M	Strong-H	Medium-M	-	-	-	-	-	-	Medium-M	Medium-M	Medium-M
					CO4	Classifying data science problems into standard typology would depend on the programming language	Medium-M	Strong-H	Medium-M	Medium-M	-	-	-	-	-	-	-	Medium-M	Medium-M	Medium-M
80	VII	701220714	T7138	NETWORK SECURITY	CO1	Understand and discuss different types of threat scenarios, security models, security policies and Design Guidelines	-	-	-	Low-L	-	Strong-H	Medium-M	Strong-H	-	-	-	-	Medium-M	
					CO2	Interprete and use various private-key and public-key cryptographic algorithms	Medium-M	Medium-M	Medium-M	Low-L	Strong-H	-	-	Low-L	-	-	-	Medium-M	Medium-M	Medium-M
					CO3	Compare various techniques of packet level (IP level) security mechanisms for network level protocols	Medium-M	Medium-M	-	Low-L	Strong-H	-	-	Low-L	-	-	-	Medium-M	Medium-M	Medium-M
					CO4	Analyze various Transport and Application Layer security techniques	Low-L	Medium-M	Medium-M	Low-L	Strong-H	-	-	Low-L	-	-	-	Medium-M	Medium-M	Medium-M
81	VII	701220713	T7529	Machine Learning	CO1	Summarize the basics of machine Learning and Dimensionality reduction techniques.	Medium-M	Medium-M	Medium-M	-	-	-	-	-	-	-	-	Medium-M	Medium-M	Strong-H
					CO2	Illustrate classification techniques using basic classification algorithms.	Low-L	Medium-M	Medium-M	-	-	-	-	-	-	-	-	Medium-M	Medium-M	Strong-H
					CO3	Apply regression techniques to achieve analysis of data.	Medium-M	Medium-M	Medium-M	-	-	-	-	-	-	-	-	Medium-M	Medium-M	Strong-H
					CO4	Demonstrate clustering algorithms by applying on dataset to form clusters.	Medium-M	Medium-M	Medium-M	-	-	-	-	-	-	-	-	Medium-M	Medium-M	Strong-H
					CO5	Review advanced machine learning methods.	Low-L	Medium-M	Medium-M	-	-	-	-	-	-	-	-	Medium-M	Medium-M	Strong-H
82	VII	701220715	TE7103	Natural Language Processing (Elective Course)	CO1	Understand the basics of concepts of Natural Language Processing.	Medium-M	-	-	-	Strong-H	-	-	-	Strong-H	Strong-H	-	Medium-M	Medium-M	Strong-H
					CO2	Evaluate different knowledge and comprehension techniques in Natural Language Processing.	Medium-M	-	Strong-H	-	Strong-H	-	-	-	Strong-H	Strong-H	-	Medium-M	Medium-M	Strong-H
					CO3	Understand and apply different parsing techiques in Natural Language Processing.	Medium-M	-	Strong-H	-	Strong-H	-	-	-	Strong-H	Strong-H	-	Medium-M	Medium-M	Strong-H
					CO4	Evaluate different research problems in Natural Language Processing.	Medium-M	Strong-H	Medium-M	-	Strong-H	-	-	-	Strong-H	Strong-H	-	Medium-M	Medium-M	Strong-H
					CO5	Analyse and compare different approaches to Natural Language Processing.	Medium-M	Medium-M	-	Strong-H	Strong-H	-	-	-	Strong-H	Strong-H	-	Medium-M	Medium-M	Strong-H
83	VII	701220716	TE7105	Machine Learning Lab	CO1	Implement dimensionality reduction using PCA, Random Forest, SVM	Strong-H	Medium-M	Medium-M	Medium-M	Strong-H	-	-	-	-	-	-	Strong-H	Strong-H	Strong-H
					CO2	Illustrate classification using basic classification algorithms	Strong-H	Medium-M	Medium-M	Medium-M	-	-	-	-	-	-	-	Strong-H	Strong-H	Strong-H
					CO3	Understand and apply to achieve analysis of data	Strong-H	Medium-M	Medium-M	Medium-M	Strong-H	-	-	-	-	-	-	Strong-H	Medium-M	Strong-H
					CO4	Demonstrate clustering algorithms by applying on dataset to form clusters	Strong-H	Medium-M	Medium-M	Medium-M	Strong-H	-	-	-	-	-	-	Strong-H	Strong-H	Strong-H
					CO5	Apply the machine learning methods to implement a mini- project	Strong-H	Medium-M	Medium-M	Medium-M	Strong-H	-	-	-	-	-	-	Strong-H	Medium-M	Strong-H
84	VII	701220717	TE7106	Natural Language Processing Lab	CO1	Analyse and demonstrate the fundamentals for Natural Language Processing.	Medium-M	-	-	-	Medium-M	-	-	-	-	-	-	Strong-H	Medium-M	Strong-H
					CO2	Evaluate different Natural Language Processing libraries and tools.	Medium-M	Medium-M	Medium-M	-	-	-	-	-	-	-	-	Strong-H	Strong-H	Strong-H
					CO3	Apply different text pre-processing techniques in Natural Language Processing.	Medium-M	Medium-M	Strong-H	Medium-M	-	-	-	-	-	-	-	Strong-H	Strong-H	Strong-H
					CO4	Evaluate different vectorization techniques in Natural Language Processing.	Medium-M	Medium-M	Medium-M	-	-	-	-	-	-	-	-	Strong-H	Strong-H	Strong-H
					CO5	Comparing different algorithms and research problems in Natural Language Processing.	Low-L	Medium-M	Strong-H	Strong-H	-	-	-	-	-	-	-	Strong-H	Medium-M	Medium-M
85	VII	701220718	T7506	NETWORK SECURITY LAB	CO1	Demonstrate working on N-map tool for Network forensic	Low-L	Medium-M	-	Low-L	Medium-M	Medium-M	-	Strong-H	-	-	-	Medium-M	Strong-H	Medium-M
					CO2	Illustrate the applications of basic cryptography using cryptool	Low-L	Medium-M	-	Low-L	Medium-M	Medium-M	-	Strong-H	-	-	-	Medium-M	Strong-H	Medium-M
					CO3	Implement Symmetric and Asymmetric key Encryption algorithms	Low-L	Medium-M	-	Low-L	Medium-M	Medium-M	-	Strong-H	-	-	-	Medium-M	Strong-H	Medium-M
					CO4	Analyze use of Hashing function	Low-L	Medium-M	-	Low-L	Medium-M	Medium-M	-	Strong-H	-	-	-	Medium-M	Strong-H	Medium-M
					CO5	Distinguish relevance of Intrusion Detection System	Low-L	Medium-M	-	Low-L	Medium-M	Medium-M	-	Strong-H	-	-	-	Medium-M	Strong-H	Medium-M

Sr. No	Sem	Course Code	Subject Code	Course Name	CO	CO Description	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
86	VII	701220720	TE7297	Software Testing Tools	CO1	Classify, distinguish and compare different software testing approaches	Medium-M	Medium-M	Low-L	-	-	-	-	-	-	-	-	-	-	-	-
					CO2	Analyse and design good test cases using different case studies and test case deign strategies such as black box testing and white box testing.	Medium-M	Medium-M	Low-L	-	-	-	-	-	-	-	-	-	-	-	-
					CO3	Analyse, classify and compare different automation tools like Bugzilla, Selenium, and QTP, and list its features	Medium-M	Medium-M	Medium-M	-	-	-	-	-	-	-	-	-	-	-	-
					CO4	Analyse, classify and compare different automation tools like Bugzilla, Selenium, and QTP, and list its features.	Medium-M	Medium-M	Medium-M	-	-	-	-	-	-	-	-	-	-	-	-
87	VII	701220721	TE7916	Cloud Computing Tools and Techniques	CO1	Explain the core concepts of the cloud computing paradigm: how and why this paradigm shift came about	Medium-M	Medium-M	Medium-M	-	-	-	-	-	-	-	-	-	-	-	
					CO2	Learn about the characteristics, advantages and challenges brought about by the various mode and services in cloud computing.	Medium-M	-	Medium-M	-	Strong-H	-	-	-	-	Medium-M	-	Medium-M	Medium-M		
					CO3	Apply fundamental concepts in cloud infrastructures to understand the tradeoffs in power, efficiency and cost	Medium-M	Strong-H	Strong-H	-	Strong-H	-	-	-	-	Medium-M	-	Medium-M	Medium-M		
					CO4	Explore the simulation tools available in cloud programming.	Medium-M	-	Medium-M	-	Strong-H	-	-	-	-	Medium-M	-	Medium-M		Medium-M	
					CO5	Analyze various cloud programming tools and platforms and apply them to solve problems on the cloud.	Medium-M	Strong-H	Medium-M	Strong-H	Strong-H	-	-	-	-	Medium-M	-	Medium-M	Medium-M	Medium-M	
88	VIII	701220801	T7912	Internship	CO1	Integrate the theory concept to develop functional and non-functional requirement of the given project during the internship	Medium-M	Strong-H	Strong-H	-	Medium-M	-	Low-L	Medium-M	Strong-H	-	Low-L	Strong-H	Strong-H	Low-L	
					CO2	Develop work proficiencies as required by industry.	-	-	Medium-M	-	-	Strong-H	Low-L	Strong-H	Strong-H	Medium-M	Medium-M	Strong-H	Strong-H	Low-L	
					CO3	Illustrate the technical knowledge that they have gained during internship tenure	Medium-M	Strong-H	Strong-H	Strong-H	Strong-H	-	Low-L	Medium-M	Strong-H	-	Low-L	Strong-H	Strong-H	Medium-M	
					CO4	Develop interpersonal communication skills during time period of internship	Strong-H	Strong-H	Low-L	-	-	-	Medium-M	Low-L	Strong-H	Strong-H	Strong-H	Medium-M	Strong-H	Strong-H	Low-L
89	VIII	701220802	T7802	Seminar	CO1	Demonstrate competence in identifying relevant information on the given topics	Strong-H	Strong-H	-	-	Medium-M	-	-	-	Strong-H	-	-	Medium-M	Medium-M	Medium-M	
					CO2	Identify engineering problems in the domain of internship and analyze it for possible solution	Strong-H	Strong-H	Medium-M	Medium-M	Medium-M	-	-	-	Strong-H	-	-	Medium-M	Medium-M	Medium-M	
					CO3	Understand the research requirement of the identified problem and prepare report on it	-	Strong-H	-	-	Strong-H	-	-	Medium-M	Strong-H	Strong-H	-	Medium-M	Medium-M	Medium-M	
					CO4	Present literature survey performed on the topic	-	Strong-H	-	-	Medium-M	-	-	Medium-M	Strong-H	Strong-H	-	Medium-M	Medium-M	Medium-M	