

Program Education Objectives

The B.Tech. Programs at IET, JKLU are designed to prepare students for continued learning and successful careers. Our alumni are expected to:

- PEO1: Apply their technical knowledge, complex problem solving and research skills in professional practice.
- PEO2: Continue their intellectual development through critical thinking, self- study, apprenticeship, higher education, professional development courses, as well as participation in research groups and professional networks.
- PEO3: Serve as ambassadors for engineering and sustainability by exhibiting high professional standards with a deep sense of civic responsibility.
- PEO4: Effectively communicate about technical and related issues.
- PEO5: Embrace roles of team members and leaders in their career.

Program Outcomes

The graduates of B.Tech Programs at IET, JKLU will have following competencies:

- PO 1: *Life-long learning*: Demonstrate inquisitiveness, open mindedness, and the ability to engage in independent and life-long learning in the broadest context of technological, organizational, economic, and societal changes.
- PO 2: Citizenship, Sustainability, and Professional ethics
 - PO 2a: Demonstrate knowledge of constitutional values of liberty, equity, justice, and fraternity with understanding of the impact of the engineering solutions in societal and environmental contexts as well as a sense of responsibility for sustainable development.
 - PO 2b: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, cultural, and environmental issues and the consequent responsibilities relevant to the professional engineering practice.
 - PO 2c: Demonstrate commitment for professional integrity and excellence and respect for ethics, responsibilities and norms as prescribed for the engineering practice.
- PO 3: Engineering knowledge and Modern tool usage
 - PO 3a: Demonstrate clear conceptual understanding of fundamentals of engineering specialization and cognitive flexibility to appropriately ‘transfer’ what has been learned in a context, to different situations.
 - PO 3b: Apply engineering thinking, computational thinking, and the knowledge of mathematics, natural and social sciences, engineering fundamentals, information technology, engineering specialization, and engineering management to the solution of complex engineering problems.

PO 3c: Create, select, modify, and apply appropriate techniques, best practices, standards, resources, and modern engineering and IT tools including prediction and modelling to engineering and social activities with an understanding of the limitations.

PO 4: Complex problem solving, Design and Research

PO 4a: Identify, formulate, review research literature, and analyze complex engineering problems to arrive at substantiated conclusions using critical thinking along with principles of mathematics, computing, engineering as well as natural and social sciences.

PO 4b: Use systems thinking and reflection to identify and consider underlying structures, patterns, volatility, uncertainties, complexities, ambiguities, complications, and risks to design and develop engineering solutions for complex problems to meet the specified and anticipated needs with appropriate concern for constraints, performance, sustainability, and professional ethics.

PO 4c: Use research-based knowledge and research methods including design of experiments, simulation, analysis and interpretation of data, and synthesis of the information to evaluate and improve the engineering solutions and practice.

PO 5: Individual & teamwork and Engineering management

PO 5a: Ability to work effectively as an individual and as a team member or leader in diverse and distributed teams, and in multidisciplinary settings.

PO 5b: Ability to apply engineering management principles to one's own and team's work to manage engineering projects and operations and in multidisciplinary environment.

PO 6: Communication: Ability to communicate effectively on complex engineering and technology activities, situations, problems, and solutions using verbal, textual, and pictorial elements with the colleagues, engineering community, users, clients, policy makers, and society at large with intellectual honesty, clarity, empathy, and compassion.

PO 7: Innovation and entrepreneurship:

PO 7a: Demonstrate enthusiasm and understanding to identify opportunities and translate research in engineering and other disciplines to conceive and design innovative engineering solutions for business, industry, and societal problems.

PO 7b: Demonstrate enthusiasm and understanding to conceive and plan technology based new ventures either as independent start-up businesses or within existing corporate structures.

Program Specific Outcomes

B.Tech. (Computer Science and Engineering)

The computer science and engineering graduates of JKLU will be able to:

CSEPSO1: Conceive, design, implement, and manage computational and information processing systems, agents and processes by using principles of computer science, computer engineering, software engineering, artificial intelligence, data analytics, sustainability and state of the art platforms, components and tools.

CSEPSO2: Serve in ICT areas such as software development, data science, IT infrastructure, cyber security, data administration, system administration in business, consultancy, industry, government, healthcare, etc.

JK LakshmiPat University, Jaipur								
Institute of Engineering and Technology								
Department of Computer Science Engineering								
Course Structure for the B. Tech (Batch 2019-2023)								
Semester	Courses							Credits
I	Computational Data Analysis	Design and Prototyping	Experimental Science-I	Fundamentals of Communication				21
	ES1101	ES1102	AS1101	CC1101				
	(10s 2 0)	(6 0 0)	(1 0 4)	(2 0 1)				
	10	6	3	2				
II	Calculus and Applied Mechanics	Fundamentals of Automation Engineering	Object Oriented Programming	Energy and Environmental Studies	Critical Thinking and Storytelling	Scientific Perspectives	IBM SP-I (Python Programming)	20/21*
	ES1103	ES1104	CS1101	ES1105	CC1102	AS1102	CS1301 (0 2 0)	
	(6s 2 0)	(6s 2 0)	(1 0 4)	(1 0 0)	(2 0 0)		1	
	6	6	3	1	2	2		
III	Data Structures	Theoretical Foundation of Computer Science	Computational Engineering Analysis-I	Engineering Measurements and Machines	Perspectives on Contemporary Issues	Management Perspectives	IBM SP-II Data Visualisation	22/25*
	CS1102	CS1103	ES1106	ES1107	CC1103	IL1101	CS1310	
	(3 0 2)	(3 1 0)	(3 1 2)	(3 0 4)	(2 0 1)	(Management Week)	(2 0 2)	
	4	4	5	5	2	2	3	
IV	Design and Analysis of Algorithms	Database Systems	Computer Architecture and Organization	Computational Engineering Analysis-II	Communication and Identity	Introduction to Design	IBM SP-III (Enterprise Programming using Java)	21/24*
	CS1105	CS1106	CS1107	ES1109	CC1104	IL1102	CS1303	
	(3 0 2)	(3 0 2)	(3 0 2)	(3 1 2)	(2 0 1)	(Design Week)	(2 0 2)	
	4	4	4	5	2	2	3	
Practice School - I (PS1101) – (4 to 6 Weeks Duration) - 4 Credits								
V	Operating Systems	Artificial Intelligence and Machine Learning	OE-I	Understanding and Managing Conflict	Introduction to IoT	DE-I/IBM-SP-IV (Cloud Computing)		20
	CS1108	CS1110		CC1105	EE1111	CS1304		
	(3 0 2)	(3 0 2)		(2 0 0)		(3 0 2)		
	4	4	4	2	2	4		
VI	Computer Networks and Distributed Systems	Compiler Design/Software Engineering	DE-II/OE-II/IBM-SP-V (Business Intelligence)	Critical Thinking for Decisions at Workplace	(Emerging Tech Week)	DE-III/IBM-SP-VI (Big Data Engineering)	Automation Project	22
	CS1111	CS1112/CS1113	CS1305	CC1106		CS1313	PR1101	
	(3 0 2)	(3 0 2)	(3 0 2)	(2 0 0)		(3 0 2)		
	4	4	4	2	2	4	2	
VII	DE-IV	DE-V	DE-VI	OE-III	Minor Project/IBM-SP-VII (AI with IBM Watson)			20
					PR1103			
	4	4	4	4	4			
VIII	Practice School - II /Entrepreneurial Project/Research Project/Semester at a partner University							16
	Total Credits							166-173*

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Course Code: ES1101

Course Name: Computational Data Analysis

Course Outcomes: After course completion, the student will be able to

- ES1101.1. Write Simple Python programs using various datatypes, control structures, decision statements, libraries, functions (M1)
- ES1101.2. Develop Python programs using Objects, Classes and Files (M1, M2)
- ES1101.3. Develop Programs for analyzing and interpreting Complex situations in various domains including sustainable development by combining various Linear Algebra, Statistics and Other Problem-Solving Techniques (M3)
- ES1101.4. Model Complex systems as Linear simultaneous equations and analyze the same using Matrix methods (M1)
- ES1101.5. Model Data as matrices and Find Eigen Values and Eigen Vectors and Apply the same for problem solving, e.g., ranking and performance analysis (M1)
- ES1101.6. Summarize and Visualize different datasets (M2)
- ES1101.7. Analyze and interpret different datasets using Discrete and Continuous Probability Distributions and Apply the same for problem solving, e.g., Goodness of Fit (M2)
- ES1101.8. Formulate and validate hypothesis with reference to different datasets (M2)
- ES1101.9. Apply correlation, regression, least square method and time series analysis for modeling, analysis, interpretation, and forecasting (M2)

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO -1	PSO-2
ES1101.1																	
ES1101.2											1						
ES1101.3					1	1					1			1			
ES1101.4			1		1	1				1	1						
ES1101.5			1		1	1				1	1			1			
ES1101.6					1	1		1			1		2				
ES1101.7		1	1		1	1		1			1		1	1			
ES1101.8		1	1		2	1		2			1		1	1			
ES1101.9		1	1		2	1		2		1	1		1	1			

Course Code: ES1102

Course Name: Design and Prototyping

Course Outcomes: After course completion, the student will be able to

- ES1102.1. Approach design challenges from the perspective of the user and offer innovative solutions effectively.
- ES1102.2. Communicate and work in team towards a common goal.
- ES1102.3. Think creatively towards a fun based, desirable solution.
- ES1102.4. Develop the projection views of the products with dimensions and scales.
- ES1102.5. Create the schematic diagram and isometric view of the parts using AutoCAD.
- ES1102.6. Fabricate prototype by combining the different parts.

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
ES1102.1	2	1	1	1										2			
ES1102.2											1	1	1				
ES1102.3	2				2	1	1	1						2			
ES1102.4					1	1	1										
ES1102.5	1				2	1	1										
ES1102.6	2				2	1	1				1	1	1				

Course Code: AS1101

Course Name: Experimental Science-I

Course Outcomes: On successful completion of this course, the students will be able to:

- AS1101.1. analyze ferromagnetic properties of any magnetic material and differentiate Soft and hard materials.
- AS1101.2. analyze thermoelectric effect of metal junctions due to temperature differences.
- AS1101.3. analyze nuclear radiation with respect to distance and thickness of absorbing media.
- AS1101.4. measure electrical properties e.g., specific resistance, time constant of various electrical components.
- AS1101.5. use Schroedinger equation and quantum mechanical approach to analyze behavior of the quantum particle under different potentials.
- AS1101.6. differentiate hard and soft water by determining its hardness of different water samples.
- AS1101.7. analyze conductivity of samples by different techniques such as volumetric titrations and conductometric.
- AS1101.8. determine properties of the lubricant/oil samples by Pensky-Martens and Red Viscometer.

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes		
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2	
AS1101.1	1				1									1				
AS1101.2	1																	
AS1101.3	1										1							
AS1101.4	1				1						1							
AS1101.5	1																	
AS1101.6	1		1		1	1	1				1		1		1			
AS1101.7	1		1				1				1		1					
AS1101.8	1																	

Course Code: CC1101

Course Name: Fundamentals of Communication

Course Outcomes: After course completion, the student will be able to:

CC1101.1. Identify different cultural differences and their impact on communication.

CC1101.2. Compose grammatically correct sentences and paragraphs.

CC1101.3. Deliver effective oral presentations following appropriate kinesics and paralinguistic features.

CC1101.4. Identify impact of cultural differences on communication.

CC1101.5. Apply appropriate communication skills across settings, purposes, and audiences.

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
CC1101.1									1		1		1				
CC1101.2																	
CC1101.3	1										1						
CC1101.4																	
CC1101.5	1										1		1				

Course Code: ES1103

Course Name: Calculus and Applied Mechanics

Course Outcomes: After course completion, the student will be able to

- ES1103.1. apply analytical techniques to determine forces in structures
- ES1103.2. use commercial software (STAAD Pro.) to simulate a structure/frame and determine force in the members
- ES1103.3. model physical phenomena using calculus and solve using appropriate method
- ES1103.4. apply Newton's laws of motion and understand the concepts of dynamics concepts (force, momentum, work and energy)
- ES1103.5. interpret the geometrical significance of differential and integral calculus
- ES1103.6. solve problems of vector differentiation and integration
- ES1103.7. calculate the buoyant forces of objects with various shape and carryout the stability analysis
- ES1103.8. apply the concept of partial differentiation to solve optimization problems

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
ES1103.1						2					1		2				
ES1103.2						2	2				1						
ES1103.3	1				1	2	2		1		2		1				
ES1103.4	2				1	2	2				1						
ES1103.5	1				1	2	2										
ES1103.6						1	1										
ES1103.7						1	1		1		1		2				
ES1103.8						2	1				1		1				

Course Code: ES1104

Course Name: Fundamentals of Automation Engineering

Course Outcomes: On successful completion of this course, the students should be able to:

- ES1104.1. Analyze electrical circuits using network theorems,
- ES1104.2. Measure electrical parameters of passive as well as active electrical components,
- ES1104.3. Design rectifier circuit using semiconductor devices,
- ES1104.4. Design filters for power conditioning,
- ES1104.5. Design and test a linear power supply for given specifications,
- ES1104.6. Design and build Printed Circuit Boards,
- ES1104.7. Use electrical safety practices while working on electrical projects,
- ES1104.8. Formulate mathematical models for basic electro-mechanical systems,
- ES1104.9. Design and simulate a basic analog open-loop control system,
- ES1104.10. Evaluate and simplify Boolean functions and design the minimized logic using logic gates,
- ES1104.11. Design basic combinational and sequential circuits with minimum complexity,
- ES1104.12. Implement combinatorial circuit using simulation tools.

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes		
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2	
ES1104.1.					2			1										
ES1104.2.						2								1				
ES1104.3.					1			1										
ES1104.4.					2							1		1				
ES1104.5.					1							1		1				
ES1104.6.							1		1			1		1				
ES1104.7.	2						2						1					
ES1104.8.	2				2			2						2				
ES1104.9.					1							1		1				
ES1104.10.																		
ES1104.11.	2				2							1						
ES1104.12.						2			2			1	1	1				

Course Code: CS1101

Course Name: Object Oriented Programming

Course Outcomes: On successful completion of this course, the students should be able to:

- CS1101.1. Develop Java Programs with the concepts of primitive data types, strings and arrays.
- CS1101.2. Develop Java Programs using Object Oriented Programming Principles such as Classes, Objects, Data Abstraction, Data Encapsulation, Overloading, Overriding, Polymorphism, Inheritance, and Interfaces.
- CS1101.3. Design, develop and debug programs in Core Java using coding and documentation standards.
- CS1101.4. Incorporate exception handling in Java Programs.
- CS1101.5. Use JDBC API connectivity in between Java Programs and database.

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
CS1101.1					1	1	1							1			
CS1101.2																	
CS1101.3					1	1					1	1		1			
CS1101.4																	
CS1101.5											1	1					

Course Code: ES1105

Course Name: Energy and Environmental Studies

Course Outcomes: On successful completion of this course, the student should be able to:

ES1105.1. Relate renewable energy with ecology & environment

ES1105.2. Explain the climate change and threat to biodiversity

ES1105.3. Describe the various pollution sources and their impacts on Environment

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
ES1105.1	1					1											
ES1105.2		1									1						
ES1105.3	1				1												

Course Code: CC1102

Course Name: Critical Thinking and Storytelling

Course Outcomes: On successful completion of this course, the student should be able to:

- CC1102.1. Formulate intelligent questions to investigate.
- CC1102.2. Evaluate information and argument for correctness, consistency, relevance, and validity.
- CC1102.3. Compose well-structured and well-reasoned arguments.
- CC1102.4. Articulate and evaluate the impact of narratives.
- CC1102.5. Distinguish between facts, assumptions and opinion.

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes		
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2	
CC1102.1			1					1										
CC1102.2			1			1							1					
CC1102.3											1							
CC1102.4													1					
CC1102.5													1					

Course Code: AS1102

Course Name: Scientific Perspectives

Course Outcomes: After course completion, the student will be able to

- AS1102.1. Distinguish between science, pseudo-science and other forms of knowledge.
- AS1102.2. Distinguish between science, engineering, technology and mathematics and also identify the opportunities for integrating these disciplines.
- AS1102.3. Use the scientific approach to identify and understand the societal problems
- AS1102.4. Explain, Design and carry out Scientific studies

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
AS1102.1	1												1				
AS1102.2					1	1											
AS1102.3		1			1												
AS1102.4	1												1				

Course Code: CS1301

Course Name: Python Programming

Course Outcomes: On successful completion of this course, the student should be able to:

- CS1301.1. Design and program the standalone Python applications.
- CS1301.2. Use lists, tuples, and dictionaries in Python programs.
- CS1301.3. Identify Python object types.
- CS1301.4. Design structure and components of a Python program.
- CS1301.5. Use Python Control and Decision-making Structures for writing programs
- CS1301.6. Write long iterative programs into recursive code.
- CS1301.7. Build programs that related to text analytics.
- CS1301.8. Build small graphics and animation programs.
- CS1301.9. Design machine learning model to perform data analysis.
- CS1301.10. Build own Python packages or modules for reusability.
- CS1301.11. Read and write files in Python.
- CS1301.12. Use Data Handling Techniques of Python
- CS1301.13. Use exception handling in Python applications for error handling, find syntax errors

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes		
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2	
CS1301.1	1																	
CS1301.2											1							
CS1301.3						1												
CS1301.4																		
CS1301.5										1								
CS1301.6																		
CS1301.7							1									1		
CS1301.8			1															
CS1301.9						1												
CS1301.10			1															
CS1301.11																		
CS1301.12									1									
CS1301.13													1					

Course Code: CS1102

Course Name: Data Structures

Course Outcomes: On successful completion of this course, the students should be able to:

- CS1102.1. Write programs for performing basic operations like insertion, deletion, searching, sorting, merging, traversal etc. on various data structures like array, queue, stack, linked list, tree, graph.
- CS1102.2. Use and design appropriate data structures for solving a variety of computational problem.
- CS1102.3. Develop test cases for their programs and debug the code.
- CS1102.4. Analyze the algorithms in terms of asymptotic time and space complexity.
- CS1102.5. Implement and compare various searching and sorting algorithms
- CS1102.6. Convert a recursive algorithm to non-recursive algorithm.

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
CS1102.1	1		1		1	1						1					2
CS1102.2			1		1	1										2	2
CS1102.3	2			1	1	1				1			1				2
CS1102.4		1			1		1					2				2	2
CS1102.5	1				1		1									2	2
CS1102.6	1			1	1						1		1			2	2

Course Code: CS1103

Course Name: Theoretical Foundation of Computer Science

Course Outcomes: On successful completion of this course, the students will be able to:

- CS1103.1. construct and validate simple computing models which play a crucial role in compiler design, algorithms, etc.
- CS1103.2. construct conceptual models using discrete mathematics in various application areas such as linguistic, business, internet, etc.
- CS1103.3. develop problem solving and critical thinking skills to solve complex computing problems
- CS1103.4. use logics and proofs in order to read, comprehend and construct mathematical arguments
- CS1103.5. develop mathematical models of computation and describe how they relate to formal languages
- CS1103.6. relate the basic difference between deterministic and nondeterministic computing machines
- CS1103.7. Interpret the language accepted by Turing machine.

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
CS1103.1					1		1	1		1						2	1
CS1103.2					1			1	1					1		2	1
CS1103.3					1	1	1	1	1					1		2	1
CS1103.4					1	1		1					1			1	1
CS1103.5					1	1		1					1	1		1	1
CS1103.6					1			1					1			1	1
CS1103.7					1			1		1			1			1	1

Course Code: ES1106

Course Name: Computational Engineering Analysis – I

Course Outcomes: On successful completion of this course, the students will be able to:

- ES1106.1. Solve ordinary differential equations through various techniques.
- ES1106.2. Determine the structural behavior of the body by determining the stresses, strains produced by the application of load.
- ES1106.3. Analyze the concept of buckling and be able to solve the problems related to column and struts.
- ES1106.4. Model the problems of column and struts mathematically in terms of ordinary differential equations and solve them using the appropriate method.
- ES1106.5. Simulate the solutions of the above-mentioned models of columns and struts.
- ES1106.6. Analyze a function of complex variables in terms of analyticity, poles and zeroes.
- ES1106.7. Find Laplace and inverse Laplace transforms of given function and use Laplace transform to solve ordinary differential equations.
- ES1106.8. Design and Evaluate the LC, RC & RL Networks using Foster's and Cauer Forms
- ES1106.9. Analyze stability criteria for electrical network using pole zero plot and Routh-hurwitz polynomials
- ES1106.10. Model and simulate electrical networks using Proteus simulator/ Virtual lab.

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
ES1106.1					2	2	2	1	1		1	1					
ES1106.2					2			2									
ES1106.3					1			1							1		
ES1106.4		1			1	2	2	1	1	1	2	1					
ES1106.5							2	1		1							
ES1106.6					2												
ES1106.7					2	2	1	1	1		1	2					
ES1106.8					2	2		2			1	1		1			
ES1106.9					2	2		1			1	1					
ES1106.10	1						1		1								

Course Code: ES1107

Course Name: Engineering Measurements and Machines

Course Outcomes: On successful completion of this course, the students be able to:

- ES1107.1. Evaluate suitable electrical and non-electrical instruments for measuring physical quantities.
- ES1107.2. Analyze the construction, characteristics and applications of various types of rotating machines.
- ES1107.3. Analyze the working of any mechanical and electrical machine using mathematical model.
- ES1107.4. Integrate the sensors for monitoring and automation of electrical and mechanical systems.
- ES1107.5. Design electro-mechanical machines as per Indian standards.

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
ES1107.1	2				2	1	1				1	1	1	1			
ES1107.2		1			1	1	1	1									
ES1107.3					1	2	1	1	1		1						
ES1107.4	1	1	1		1	1	1	1	1		1		1				
ES1107.5	1		1	1	1	1	1	1	1		1	1					

Course Code: CC1103

Course Name: Perspectives on Contemporary Issues

Course Outcomes: After course completion, the student will be able to

- CC1103.1. Identify different perspectives objectively.
- CC1103.2. Explain interconnectedness of the issues and their impact at micro and macro levels.
- CC1103.3. Recognize their own beliefs, biases, claims and assumptions.
- CC1103.4. Evaluate sources, argue and defend effectively.

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
CC1103.1	1		1					1			1	1					
CC1103.2						1					1	1	1				
CC1103.3											1	1	1				
CC1103.4	1		1									1	1				

Course Code: IL1101

Course Name: Management Perspectives

Course Outcomes: After course completion, the student will be able to

- IL1101.1. Comprehend the importance of management and its functional areas in businesses and also its interaction with technology.
- IL1101.2. Highlight specific external and internal issues impacting businesses.
- IL1101.3. Integrate and analyze multiple dimensions of management aspects to solve business problems.
- IL1101.4. Evaluate the aspects that management might consider when evaluating technical and engineering projects such as planning and scheduling, personnel management, cost control etc. from a management perspective

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes		
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2	
IL1101.1	1				1													
IL1101.2	1	1											1					
IL1101.3	2		1		1						1		1					
IL1101.4	1			1							2	1						

Course Code: CS1310

Course Name: Data Visualization

Course Outcomes: On successful completion of this course, the students should be able to:

- CS1310.1. Present the data in a form that makes sense to people.
- CS1310.2. Apply various techniques for presenting data visually with R
- CS1310.3. Make use of data visualization libraries in Python, viz. Matplotlib, Seaborn, and Folium.
- CS1310.4. Create own data science projects using Tableau.

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
CS1310.1					1	1	1							1			
CS1310.2					1	1	1										
CS1310.3					1	1	1										
CS1310.4					1	1	1	1						1	1	1	1

Course Code: CS1105

Course Name: Design and Analysis of Algorithms

Course Outcomes: On successful completion of this course, the students should be able to:

- CS1105.1. Analyze the complexity of different algorithms using asymptotic analysis.
- CS1105.2. Analyze and select an appropriate data structure for a computing problem.
- CS1105.3. Differentiate between different algorithm designs technique: Divide and Conquer Technique, Greedy, Backtracking, and Dynamic Programming. Also, recognize when an algorithmic design situation calls for using these.
- CS1105.4. Develop algorithm and programs using Divide and Conquer technique to solve various computing problems, e.g., Sorting, Strassen's matrix multiplication, and Closest pair.
- CS1105.5. Develop energy-efficient algorithms and programs using Greedy approach to solve various computing problems, e.g., Minimum Spanning Trees, Shortest Path, Knapsack, Job scheduling, Graph coloring etc.
- CS1105.6. Develop algorithms and programs using Backtracking technique to solve various computing problems, e.g., N queen, Hamiltonian Cycle detection, Travelling salesman, and Network flow.
- CS1105.7. Develop algorithms and programs using Dynamic Programming technique to solve various computing problems, e.g., Knapsack, Shortest path, Coinage, Matrix Chain Multiplication, Longest common subsequence.
- CS1105.8. Apply Query optimization algorithms using Greedy and Dynamic programming approaches.
- CS1105.9. Apply various search-based problem-solving methods e.g., Uninformed search (BFS, DFS, DFS with iterative deepening), Heuristics, and Informed search (hill-climbing, generic best-first, A*).
- CS1105.10. Evaluate and apply appropriate energy efficient algorithmic design technique for solving complex computing problem.
- CS1105.11. Explain the ways to analyze randomized algorithms (expected running time, probability of error).
- CS1105.12. Differentiate between P, NP, NP-Complete, and NP-Hard problems.

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
CS1105.1	2		1		2											2	2
CS1105.2	2		1		2				1							2	2
CS1105.3	2		1		2				1							2	2
CS1105.4	2		1		1				1							2	2
CS1105.5	1		1		1				1							2	2
CS1105.6	1															2	2
CS1105.7	1		1		1				2							2	2
CS1105.8	1							1						1			2
CS1105.9	1				1			1	1					1	1	2	2
CS1105.10								1						1		2	2
CS1105.11	1		1		1			1						1			1
CS1105.12	1		1		1			1						1			1

Course Code: CS1106

Course Name: Database Systems

Course Outcomes: On successful completion of this course, the students should be able to:

- CS1106.1. Outline database system components and their functions
- CS1106.2. Model the real-world systems from the given requirements specification using Entity Relationship Diagrams/Unified Modelling Language
- CS1106.3. Convert the ER model into a relational logical schema using various mapping algorithms
- CS1106.4. Apply SQL commands to define, query and manipulate a relational database
- CS1106.5. Apply SQL coding standards to embed SQL in an application program
- CS1106.6. Write relational algebra expressions and optimize the same for given query
- CS1106.7. Convert relational algebra expressions into SQL commands and vice versa
- CS1106.8. Normalize a given database up to Boyce Codd Normal Form (BCNF) based on identified keys and functional dependencies
- CS1106.9. Determine the transaction atomicity, consistency, isolation, and durability for a given transaction-processing system.
- CS1106.10. Determine the deadlock in transaction-processing system. Apply the method of deadlock avoidance and deadlock detection and recovery
- CS1106.11. Apply various concurrency control protocol like two phase locking, timestamping and the method of log base recovery in case of failure

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
CS1106.1	1				1	1	1				1	1	1			1	1
CS1106.2	1	1			1	2	2		1		1					1	2
CS1106.3	1	1			1	2	2		1		1					1	2
CS1106.4	1				1	1	1									1	
CS1106.5	1					1		1	1		1					2	1
CS1106.6	1	1			1			1	1				1			1	1
CS1106.7	1							1								1	1
CS1106.8	1	1			1	2	2	1	1		1					2	2
CS1106.9	1		1				1	1	1				1			1	1
CS1106.10	1		1				1	1	1				1			1	1
CS1106.11	1				1								1			1	1

Course Code: CS1107

Course Name: Computer Architecture and Organization

Course Outcomes: On successful completion of this course, the students should be able to:

- CS1107.1. Draw the functional block diagram of single bus architecture of a computer and describe the function of the instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set.
- CS1107.2. Summarize and compare different computer systems.
- CS1107.3. Categorize different types of computers based on Instruction set Architecture.
- CS1107.4. Develop assembly language programs for multiplication, division, and I/O interface using 8086.
- CS1107.5. Given a CPU organization and instruction, design a memory module and analyze its operation by interfacing with the CPU.
- CS1107.6. Write a flowchart for Concurrent access to memory and cache coherency in Parallel Processors and describe the process.
- CS1107.7. Given a CPU organization, assess its performance, and apply design techniques to enhance performance using pipelining, parallelism and RISC methodology.
- CS1107.8. Analyze the performance of pipeline and cache-based systems.
- CS1107.9. Design algorithms to optimize hit-rate in cache memory.
- CS1107.10. Program and estimate the execution time of arithmetic functions using different number systems.

Course Outcome	Correlation with program outcomes														Correlation with program specific outcomes		
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
CS1107.1		1		1				1				1				2	
CS1107.2	1		1			1								1			2
CS1107.3		1					1				1						
CS1107.4			1		1				1	1			1			2	2
CS1107.5	1							1				1		1		2	
CS1107.6		1		2			2				1					2	2
CS1107.7	1		1		1				1			1					2
CS1107.8	1	2				2				2				1		2	2
CS1107.9	1		1		1			1				1				2	
CS1107.10	1	2				2			2				1				2

Course Code: ES1109

Course Name: Computational Engineering Analysis – II

Course Outcomes: After course completion, the student will be able to

- ES1109.1. Classify various types of partial differential equations and solve them through various analytical and numerical methods.
- ES1109.2. Formulate and analyze differential equations especially Navier stokes and energy equations and use numerical methods for solving the same.
- ES1109.3. Use Numerical method for solving partial differential equations using finite difference method.
- ES1109.4. Find Fourier and inverse Fourier transforms of given function and use Fourier transform to solve partial differential equations.
- ES1109.5. Find Z-transform and inverse Z-transforms of given functions and use them to analyze control systems.
- ES1109.6. Design and analyse various types of filters and attenuators to minimize power losses and improve signal quality.
- ES1109.7. Solve problems involving vertex and edge connectivity, planarity and crossing numbers.

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
ES1109.1	1				1	1		1			1						
ES1109.2	2		2		2	2	1	2			1		1	2			
ES1109.3						1	2										
ES1109.4					2	2		1			1						
ES1109.5	1		1		2	2		1			1			1			
ES1109.6		1				1	2			2				1			
ES1109.7						1	2	2						1			

Course Code: CC1104

Course Name: Communication and Identity

Course Outcomes: After course completion, the student will be able to

- CC1104.1. Analyse their personal identities, both private and social
- CC1104.2. Identify their different values, strengths and areas of professional interest
- CC1104.3. Articulate their personal statement and use it to craft an influential pitch
- CC1104.4. Express themselves through various communication formats on different platforms

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
CC1104.1													1	1			
CC1104.2	1		2	1										2			
CC1104.3													1				
CC1104.4													2				

Course Code: IL1102

Course Name: Introduction to Design

Course Outcomes: After course completion, the student will be able to

- IL1102.1. Identify the user and build persona of the
- IL1102.2. Sketch their ideas on paper to visualize and assess viability.
- IL1102.3. Create a plan for process and management to materialize the desired idea.
- IL1102.4. Test the material for possibilities and capabilities.
- IL1102.5. Develop skills of joinery, material manipulation and various hand tools.
- IL1102.6. Develop technical and narrative skills useful for both film and animation.
- IL1102.7. Develop troubleshooting and problem-solving skills.

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
IL1102.1	1								1	1			1	1			
IL1102.2	2						1						2				
IL1102.3	1						1	1						2			
IL1102.4	1						1	1									
IL1102.5							1	1									
IL1102.6	2						1						1				
IL1102.7	1		1			1	1										

Course Code: CS1303

Course Name: Enterprise Programming using JAVA

Course Outcomes: On successful completion of this course, the students should be able to:

- CS1303.1. Design, develop and debug software applications in Core Java taking into account coding and documentation standards.
- CS1303.2. Apply concepts like multithreading, interfaces, generics in Java program design and implementation.
- CS1303.3. Use JDBC API for database-independent connectivity between the Java programs and MySQL database.
- CS1303.4. Develop server-side solution using Servlet and JSP technologies.
- CS1303.5. Design, develop, and debug web applications using Aspect Oriented Programming using Spring Framework.

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
CS1303.1					1	1	1							1			
CS1303.2					1	1	1										
CS1303.3					1	1								1			
CS1303.4					2	2	2	1						1	1	1	1
CS1303.5											1	1				1	

Course Code: CS1108

Course Name: Operating System

Course Outcomes: On successful completion of this course, the students will be able to:

- CS1108.1. Use basic LINUX commands: file/directory handling, standard I/O, redirection, pipes, and filters.
- CS1108.2. Analyze the structure of OS and its interface with hardware.
- CS1108.3. Differentiate between different types of operating systems – Multiprogramming systems, Time-sharing systems, Parallel systems, Real-Time systems, Distributed systems and Mobiles systems. Compare Windows, Android and LINUX OS with respect to their key features and functionality.
- CS1108.4. Differentiate between various states of process and their representation using process control block (PCB). Analyze data structures used by an OS to manage the processes.
- CS1108.5. Implement and Assess the performance of different types of scheduling algorithms.
- CS1108.6. Examine process synchronization and Inter process communication- Race condition, semaphores, monitors, inter process communication through message passing.
- CS1108.7. Categorize the conditions that cause deadlock in resource allocation. Implement deadlock handling strategies.
- CS1108.8. Analyze paging, segmentation, and segmentation with paging for VM support in memory management. Implement different page replacement algorithms.
- CS1108.9. Analyze and implement various disk-scheduling algorithms.

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
CS1108.1	1				1	1	1									1	1
CS1108.2	1				1	1										1	3
CS1108.3	1				1	1										1	
CS1108.4	1				1	1										1	
CS1108.5	1				1	1	1				1	1				3	3
CS1108.6	2				2	1		1	1		1	1	2			3	3
CS1108.7	2				2	1		1	1		1	1				3	3
CS1108.8	2				2	1	1	1	1		1	1	1		1	3	3
CS1108.9	2				2	1	1	3	3		1	1	2		3	3	3

Course Code: CS1110

Course Name: Artificial Intelligence and Machine Learning

Course Outcomes: On successful completion of this course, the students should be able to:

- CS1110.1. Explain the role of agents and how it is related to environment and the way of evaluating it and how agents can act by establishing goals.
- CS1110.2. Implement intelligent agents for making computers solve critical problems the way human beings do.
- CS1110.3. Analyze the usage of Game theory and role of heuristics for building Intelligent Agents.
- CS1110.4. Apply AI techniques in applications which involve perception, reasoning and learning.
- CS1110.5. Acquire the knowledge of real-world knowledge representation.
- CS1110.6. Identify machine learning techniques suitable for a given problem.
- CS1110.7. Interpret fundamental issues and challenges of machine learning: data, model selection, model complexity, etc.
- CS1110.8. Use the standards and energy efficient ML algorithms.
- CS1110.9. Appreciate the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning.
- CS1110.10. Utilize state-of-the art algorithms of Machine Learning for building applications related to SDG goals

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
CS1110.1	1			1												1	1
CS1110.2			1			2		2				1				2	3
CS1110.3						1					1	2		1	1	1	1
CS1110.4	2	1		1			1		2		2	2		3		3	3
CS1110.5			1		3			1					2			3	
CS1110.6	2	1		1		3			2	1	2		1		3		3
CS1110.7			1		2		3					1		2	2		3
CS1110.8	2		1					3	3		3	1		3		3	2
CS1110.9		1		1		2		2	1		2	2	3		3	3	2
CS1110.10			2	1	1		2		2	2		2		2	2	3	2

Course Code: CC1105

Course Name: Understanding and Managing Conflict

Course Outcomes: After course completion, the student will be able to

CC1105.1. Define a group and explain the stages of group development

CC1105.2. Describe conflict and explain types and causes of conflict

CC1105.3. Use inquiry and advocacy to engage with groups

CC1105.4. Give and receive feedback effectively

CC1105.5. Identify sources of conflict and manage them using difference conflict handling styles

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
CC1105.1	1										2		1				
CC1105.2	1						1										
CC1105.3	1		1					1			2	1	1				
CC1105.4	1										1		1				
CC1105.5	1										1	1	1				

Course Code: EE1111

Course Name: Introduction to IoT

Course Outcomes: On successful completion of this course, the students should be able to:

- EE1111.1. Interface the Analog and Digital sensors to Node-MCU
- EE1111.2. Develop Embedded C programs to read sensor data and upload to public cloud platform.
- EE1111.3. Use Python-based IDE (integrated development environments) for the Raspberry Pi
- EE1111.4. Interface Raspberry Pi with I/O devices.
- EE1111.5. Visualize sensor data uploaded on public cloud.
- EE1111.6. Apply standard protocol(s) for implementation of IoT Systems.
- EE1111.7. Analyze and Improve existing systems with innovative IoT based approaches.

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
EE1111.1								1		1	1						
EE1111.2							1	1	1		1						
EE1111.3								1		1							
EE1111.4								1	1	1	1		1	1			
EE1111.5							1	1		1	1			1			
EE1111.6									1	1			1	1			
EE1111.7									1	1	1						

Course Code: CS1111

Course Name: Computer Networks and Distributed Systems

Course Outcomes: On successful completion of this course, the students should be able to

- CS1111.1. Categorize the various type of Networks on the basis of geographical distance, topology and implementation.
- CS1111.2. Compare the function and services provided by different layers of OSI and TCP/IP network architectures.
- CS1111.3. Do network programming using sockets in C.
- CS1111.4. Find out the errors in the transmitted segments through error detection techniques like Checksum, Cyclic Redundancy check etc.
- CS1111.5. Use various network monitoring commands like netstat, traceroute, ipconfig etc.
- CS1111.6. Analyze the underlying architectures and protocols of networking applications like File Transfers, Mail Transfers etc.
- CS1111.7. Apply the concepts of IP addressing, subnet masking and routing algorithms.
- CS1111.8. Apply and compare the sliding window – Transmission Control Protocols like Go-Back N, Stop-N-Wait and Selective Repeat using the criteria of segment loss, acknowledgement loss etc.
- CS1111.9. Analyze distributed systems and understand classification of agreement protocol.
- CS1111.10. Apply the concept of logical clocks and global clocks in distributed systems.

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
CS1111.1	1			1	1	2		1	1	2	1		1	2		2	2
CS1111.2				1									2	1			
CS1111.3				1	2			1			3	2	1	1	3	2	3
CS1111.4						1			1	1							2
CS1111.5					1		2						1		2	2	3
CS1111.6						1	2				1	2	1			2	3
CS1111.7	1						1		2			2	1		1	3	2
CS1111.8							1	2		1		2		1		2	2
CS1111.9	1					1	2			2		1			1	2	2
CS1111.10	1			1	1					2		1			1	2	1

Course Code: CS1112

Course Name: Compiler Design

Course Outcomes: On successful completion of this course, the students should be able to:

- CS1112.1. Specify and analyze the lexical, syntactic and semantic structures of programming language features
- CS1112.2. Separate the lexical, syntactic and semantic analysis into meaningful phases for a compiler to undertake language translation
- CS1112.3. Write scanners, parsers, and semantic analyzers without the aid of automatic generators
- CS1112.4. Utilize the compiler design concept to write efficient programs
- CS1112.5. Design the structures and support required for compiling advanced language features.

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
CS1112.1	1				2	1	2									2	2
CS1112.2	1				1		1									2	2
CS1112.3	1				1		1						1			2	2
CS1112.4	1				2	1	2				1		1			3	3
CS1112.5	1				2	1	2	1	1		1	1	1			3	3

Course Code: CS1113

Course Name: Software Engineering

Course Outcomes: On successful completion of this course, the students will be able to:

- CS1113.1. Use software development lifecycle models for project development.
- CS1113.2. Explain the advantages of agile software development over traditional software engineering methods.
- CS1113.3. Apply agile development method namely Extreme Programming (XP), Adaptive software development (ASD), Scrum and Crystal for software development.
- CS1113.4. Design solutions in various application domains using software engineering approaches that integrate ethical and economic concerns.
- CS1113.5. Elicit and Evaluate functional and non-functional requirements for a software system.
- CS1113.6. Design, represent and document software requirements specification according to IEEE standards.
- CS1113.7. Apply UML modelling for software design.
- CS1113.8. Apply coding standards and guidelines.
- CS1113.9. Prepare code checklist and perform code inspections, code reviews and walkthrough.
- CS1113.10. Develop and implement various manual and automated testing procedures.
- CS1113.11. Estimate the cost of software project.
- CS1113.12. Evaluate software in terms of software quality and quality assurance according to ISO standards.
- CS1113.13. Execute activities for software project such as re-engineering, reverse engineering and software configuration.

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
CS1113.1	2				1	1										1	1
CS1113.2	1				1	1										1	1
CS1113.3	1				1	1										1	2
CS1113.4	1				1	1										1	1
CS1113.5	1				1	1										2	1
CS1113.6	1	1	1	1	1	1	2									2	2
CS1113.7	1				1	1					1	2	2			2	2
CS1113.8	1	1	1	1	1	1					1	2		1		2	2
CS1113.9	1				1	1					1	2	2	1		2	2
CS1113.10	1	1	1	1	1	1			2		1	2		1		2	2
CS1113.11	1	1	1	1	1	1			2					1		2	2
CS1113.12	1	1	1	1	1	1	2		2		2	2		2	2	3	3
CS1113.13	1	1	1	1	1	1	2		2		2	2		2	2	3	3

Course Code: CC1106

Course Name: Critical Thinking for Decisions at Workplace

Course Outcomes: After course completion, the student will be able to

- CC1106.1. Apply techniques of Critical Thinking to analyse organisational problems through positive inquiry
- CC1106.2. Describe and analyse appropriate problem-solving and ethical decision-making processes
- CC1106.3. Choose the most effective and logical decision among multiple alternatives
- CC1106.4. Evaluate solutions and anticipate likely risks based on purpose, context and ethics

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
CC1106.1	1										2		2				
CC1106.2	2					1		2					1				
CC1106.3									1		1	2	1				
CC1106.4							1	2				2					

Course Code: PR1101

Course Name: Automation Project

Course Outcomes: On successful completion of this course, the students should be able to:

- PR1101.1. Design and implement a complete project in IoT/Automation using microcontroller/SOC interfaced with sensors or any other automation hardware/tools.
- PR1101.2. Apply anyone/more standard data communication/IoT protocol(s).
- PR1101.3. Use cloud servers for data streaming/logging and analytic techniques.
- PR1101.4. Implement algorithms/signal processing using the data at edge/cloud.
- PR1101.5. Deploy techniques to conserve bandwidth/energy/other resources and achieve cost economy for project.

Course Outcome	Correlation with program outcomes															Correlation with program specific outcomes	
	PO 1	PO 2a	PO 2b	PO 2c	PO 3a	PO 3b	PO 3c	PO 4a	PO 4b	PO 4c	PO 5a	PO 5b	PO 6	PO 7a	PO 7b	PSO-1	PSO-2
PR1101.1	2				2					2		2		3			
PR1101.2						2											
PR1101.3							2										
PR1101.4	2								2								
PR1101.5					2		2										