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 & team work 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. (Electrical and Electronics Engineering)

The electrical and electronics engineering graduates of JKLU will be able to:

EEEPSO1: Conceive, design, implement, and manage electrical or electronic systems by using principles of circuit design, machines, communication systems, signal processing, digital systems, power systems, automation, control systems, computing, sustainability and state of the art components and tools.

EEEPSO2: Serve in fields of telecommunication, manufacturing, energy, EPC, IT and engineering services.

JK Lakshmipat University, Jaipur									
Institute of Engineering and Technology									
Department of Electrical & Electronics Engineering									
Course Structure for the B. Tech (Batch 2019 - 2023)									
Semester	**Courses**							**(L T P S) Credits**	**Hrs/ Week**
I	Computational Data Analysis	Design and Prototyping	Experimental Science-I	Fundamentals of Communication					
	ES1101	ES1102	AS1101	CC1101					
	(10s 2 0) 10	(6s 0 0) 6	(1 0 4) 3	2				21	25
II	Calculus and Applied Mechanics	Fundamentals of Automation Engineering	Object Oriented Programming	Energy and Environmental Studies	Critical Thinking and Storytelling	Scientific Perspectives			
	ES1103	ES1104	CS1101	ES1105	CC1102	AS1102			
	(6s 2 0) 6	(6s 2 0) 6	(1 0 4) 3	(1 0 0) 1	(2 0 0) 2	2		20	24
III	Data Structures	Computational Engineering Analysis-I	Engineering Measurements and Machines	Electronic Devices & Circuits	Perspectives on Contemporary Issues	Management Perspectives			
	CS1102	ES1106	ES1107	EE1101	CC1103	IL1101			
	(3 0 2) 4	(3 1 2) 5	(3 0 4) 5	(3 0 2) 4	2	2 (Management week)		22	25
IV	Power Systems-I/ Digital Systems Design	Computational Engineering Analysis-II	Advanced Electrical Machines/ Electromagnetics and Microwaves	Signals and Control Systems	Communication and Identity	Introduction to Design			
	EE1107/EE1110	ES1109	EE1103/EE1104	EE1105	CC1104	IL1102			
	(3 0 2) 4	(3 1 2) 5	(3 0 2) 4	(3 0 4) 5	(2 1 0) 2	2 (Design week)		22	25
	Practice School - I (PS 1101) – (4 to 6 Weeks Duration)							4	
V	Analog and Digital Communications	Analog Circuits	O E- I	DE-I	Understanding and Managing Conflict	Introduction to IoT			
	EE1109	EE1102			CC1105	EE1111			
	(3 0 2) 4	(6 0 0) 4	4	4	(2 0 0) 2	(1 0 2) 2		20	22
VI	Industrial Electronics/ Digital Communication Networks	Power Systems- II/ Digital Signal Processing	DE-II	DE-III/OE-II	Critical Thinking for Decisions at Workplace	Emerging Tech Week	Automation Project		
	EE1112/EE1208	EE1114/EE1115			CC1106		PR1101		
	(3 0 2) 4	(3 0 2) 4	4	4	2	2	(0 0 1) 2	22	17/23
VII	DE-IV	DE-V	DE-VI	OE-II	Minor Project PR1103				
	4	4	4	4	4			20	20
VIII	Practice School - II /Entrepreneurial Project/Research Project/Semester at a partner University							16	
Total Credits								167	

Contents

Course Code : ES1101

Course Name : Computational Data Analysis

Course Outcomes : On successful completion of this course, the students 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 **:** On successful completion of this course, the students 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

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 it's 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 : On successful completion of this course, the students 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 : On successful completion of this course, the students 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 will 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 combinational 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 will 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 students will 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 students will 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 Perspective

Course Outcomes : On successful completion of this course, the students 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 : CS1102

Course Name : Data Structures

Course Outcomes : On successful completion of this course, the students will 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 : 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'sand 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 will 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	1	2		1	1	1				1	1	1	1			
ES1107.2		1			1		1	1	1								
ES1107.3				1	1	2		1			1						
ES1107.4	1	1	1		1	1	1				1		1				
ES1107.5	1	1	1	1		1	1	2			1	1					

Course Code : EE1101

Course Name : Electronic Devices & Circuits

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

EE1101.1. Analyze characteristics of electronic components, devices, and circuits

EE1101.2. Apply electronic devices and circuits to various engineering applications

EE1101.3. Design and analyze different amplifier configurations

EE1101.4. Analyze input-output characteristics of a given complex network

EE1101.5. Design efficient power amplifiers with least harmonic distortion

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
EE1101.1	1		1		1		1	1	1							2	2
EE1101.2	1		1		1	1		1	1	1				1		2	2
EE1101.3						1		1	1	1						1	1
EE1101.4					1				1	1						1	
EE1101.5					1	1			1					1		1	

Course Code : CC1103

Course Name : Perspectives on Contemporary Issues

Course Outcomes : On successful completion of this course, the students 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 : On successful completion of this course, the students 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 : EE1107

Course Name : Power Systems-I

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

EE1107.1. Choose the appropriate type of power generating station in consideration to cost, environment, and societal issues.
EE1107.2. Review different tariff model and select the most appropriate model for a given scenario to optimize the revenue.
EE1107.3. Evaluate the suitability of installing overhead and underground power transmission strategies considering electrical, mechanical, environmental, performance, safety and economic constraints.
EE1107.4. Develop and use mathematical models for performance analysis of transmission and distribution networks.
EE1107.5. Design earthing system and take other measures to avoid electrical hazards.

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
EE1107.1	2	1	2		1	1	1					1	1	1	1	1	1
EE1107.2	1	1	1		1		1	1	1			1				1	1
EE1107.3	1	1		1	1	2		1		1	1		1			1	
EE1107.4					1	1	1									1	1
EE1107.5	1	1	1	1		1	1	2					1		1	2	1

Course Code : EE1110

Course Name : Digital System Design

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

EE1110.1 Describe Hardware description languages (HDL),
EE1110.2 Design Digital Circuits,
EE1110.3 Write behavioral, structural and dataflow models of digital circuits
EE1110.4 Synthesize RTL models to standard cell libraries and FPGAs
EE1110.5 Implement FSM using HDL.

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
EE1110.1	2				1											2	1
EE1110.2					1											2	1
EE1110.3					1					1							1
EE1110.4	1					1		1		1				2		2	2
EE1110.5	2					1			2					2		2	2

Course Code : ES1109

Course Name : Computational Engineering Analysis – II

Course Outcomes : On successful completion of this course, the students 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 : EE1103

Course Name : Advanced Electrical Machines

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

EE1103.1. Develop intuitive concepts regarding fundamental electromagnetic laws governing working of electrical machines including transformers, generators and motors

EE1103.2. Develop deep insight relating to construction, detailed working and modern-day applications of mentioned electrical machines

EE1103.3. Develop and analyze mathematical models for AC and DC machines under varying load conditions

EE1103.4. Identify, analyze and evaluate power conversion and control techniques to interface with an electrical machine.

EE1103.5. Analyze and evaluate the safety and compliance requirements of an electrical 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
ES1103.1	1				1	1		1	1			1				1	
ES1103.2	1				1	1						1				1	1
ES1103.3	1					1		1	1	1			1			1	1
ES1103.4		1			1	1	1				1			1			
ES1103.5	1	1	1	1	1	1	1	1					1			2	1

Course Code : EE1104

Course Name : Electromagnetics and Microwaves

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

EE1104.1. Analyze static electromagnetic field in cables, coils, etc., used in electric power transmission circuits.

EE1104.2. Analyze fluctuating electromagnetic fields in different medium, e.g., linear and isotropic medium using Maxwell's equations.

EE1104.3. Analyze characteristics of EM waves under time varying potentials and polarization of EM waves due to different mode of transmission.

EE1104.4. Analyze wave propagation through different transmission lines and plane electromagnetic waves in homogeneous media.

EE1104.5. Analyze the amount of electromagnetic noise generated by a device and test Electromagnetic compatibility (EMC) and electromagnetic interference (EMI).

EE1104.6. Design and Analyze SWR, cutoff frequency, guide wavelength, etc and Characterize microwave junctions like tees

EE1104.7. Design and Characterize microwave corner, bends & twists and directional couplers, isolators, circulators, and attenuators

EE1104.8. Analyze the applications of microwave generators like klystrons & magnetrons

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
EE1104.1			1		1			1	1							2	1
EE1104.2					1			1								2	1
EE1104.3																2	1
EE1104.4									1	1						2	1
EE1104.5	1		2	1	1	1	1	1	1			1	2	2		2	2
EE1104.6						1			1	1		1		1		2	1
EE1104.7					1				1	1						2	1
EE1104.8					1				1	1						1	1

Course Code : EE1105

Course Name : Signals and Control System

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

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

EE1105.1. Identify and differentiate signals, systems, and their properties,

EE1105.2. evaluate Fourier, Laplace, and z-transform for continuous and discrete time systems,

EE1105.3. apply properties like symmetry, time scaling, time shifting, frequency shifting, time differentiation, time integration, time convolution, frequency convolution, inverse transform on continuous and discrete signals,

EE1105.4. design open loop or closed loop control system of mechanical, electrical, thermal, chemical, or analogous systems,

EE1105.5. convert linear system to discrete system through sampling,

EE1105.6. solve the control system using block diagram reduction method and Mason's gain formula,

EE1105.7. perform the error analysis on the system,

EE1105.8. evaluate the stability of the system and effect of parameter variation on the stability using pole-zero location method, Routh-Hurwitz criterion, and root locus technique,

EE1105.9. analyse the control system in frequency domain and time domain,

EE1105.10. frequency analysis plots viz. Bode plot, Polar plot, and Nyquist Plot,

EE1105.11. improve a system as per design and equipment standards keeping energy efficiency in consideration.

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
EE1105.1	1			1	1		1									1	1
EE1105.2	1				1											1	
EE1105.3	1						1									1	
EE1105.4	1				1		1							1		1	1
EE1105.5					1								1			1	
EE1105.6	1						1										
EE1105.7	1				1											1	
EE1105.8	1				1		1									1	1
EE1105.9	1				1	1	1									1	1
EE1105.10	1				1	1	1									1	1
EE1105.11	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1

Course Code : CC1104

Course Name : Communication and Identity

Course Outcomes : On successful completion of this course, the students 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				
CC1104.1													1	1			

Course Code : IL1102

Course Name : Introduction to Design

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

IL1102.1. Identify the user and build it's persona.
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 : EE1109

Course Name : Analog and Digital Communications

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

EE1109.1: Apply the knowledge of signals and system to analyze the communication system.
EE1109.2: Implement and analyze various analog modulation and demodulation techniques as per ITU standards.
EE1109.3: Use the sampling theorem to determine optimum sampling frequency for a signal.
EE1109.4: Implement and analyze various digital modulation and demodulation techniques.
EE1109.5: Evaluate the performance of analog and digital communication systems in the presence of white noise.
EE1109.6: Improve receiver's performance by applying various 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
EE1109.1	1			1	1		1	1			1	1	1			1	1
EE1109.2		1			1		1	1	1		1		1			2	2
EE1109.3	1					1	1	1	2				1			1	1
EE1109.4		1					1	2	1	1	1		1	1		2	3
EE1109.5			1		1	1		1	1	1	1	1		1		1	3
EE1109.6	1		1				1		1				2	1		1	2

Course Code : EE1102

Course Name : Analog Circuits

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

EE1102.1 Explain electrical characteristics of op-amps and their open loop configurations,

EE1102.2 Design inverting, noninverting, and differential amplifiers,

EE1102.3 Find out frequency response, stability, transient response, bandwidth, maximum output voltage, and other important parameters of an op-amp with and without feedback

EE1102.4 Analyze and design summing and differential amplifiers, voltage to current converters, low voltage dc voltmeters, low voltage ac voltmeters, zener diode testers, light-emitting diode testers, and integrator and differentiator circuits

EE1102.5 Design and analyze filters and oscillators viz., low-pass filters, high-pass filters, band-pass filters, band-reject filters, Phase shift oscillators, Wien bridge oscillators, quadrature oscillators, square wave generators, triangular wave generators, and sawtooth wave generators.

EE1102.6 Fabricate and design some op-amp based devices such as power supplies, audio function generators, LED temperature indicators, dc motor speed controllers, appliance timers, sirens/alarms etc.

EE1102.7 Test the performance of different circuits as per IEEE, IEC, ISO and other 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
EE1102.1	2				1			1									
EE1102.2					2			1									
EE1102.3																2	1
EE1102.4																**2**	**1**
EE1102.5	2							2						1		2	1
EE1102.6	2							2		1				1		2	1
EE1102.7	2							2		1							

Course Code : CC1105

Course Name : Understanding and Managing Conflict

Course Outcomes : On successful completion of this course, the students 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 Internet of Things (IoT)

Course Outcomes : On successful completion of this course, the students will 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 : PR1101

Course Name : Automation Project

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

Course Code : EE1112

Course Name : Industrial Electronics

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

EE1112.1. Analyze the characteristics of power devices under different load condition

EE1112.2. Choose appropriate power devices for different requirement of power conversion, and speed control of drives. Also analyze and evaluate their performance

EE1112.3. Design an electric vehicle charging station with solar PV system.

EE1112.4. Design battery pack using lithium ion batteries.

EE1112.5. Use IEC standards for design and analysis of power electronics system

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
EE1112.1	1						1									1	1
EE1112.2	1															2	2
EE1112.3			1		1		1		2	1	2	1		2	2	2	3
EE1112.4			1		2		2		2	1	2	2		2	2	2	3
EE1112.5						1							2		1	2	2

Course Code : EE1208

Course Name : Digital Communication Networks

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

EE1208.1. Analyze the OSI model of networks.

EE1208.2. Analyze the various architectures employed in digital communication networks.

EE1208.3. Analyze the different protocols used in the digital networks.

EE1208.4. Design issues & protocols of wireless LANs. Emphasis on IEEE 802.11 standards. WiMax mobility support & broadband applications.

EE1208.5. Formulate, solve & understand research issues in wireless networks

EE1208.6. Design ad-hoc networks, sensor networks & mesh networks

EE1208.7. Analyze satellite, optical and mobile cellular network architectures & protocols and their applications

EE1208.8. Implement quality of service & network management functions

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
EE1208.1					1		1	1	1							2	2
EE1208.2			1		1	1	2		3	1						2	2
EE1208.3			1	2	1		1		1							2	2
EE1208.4			1	1			1		3	1						2	2
EE1208.5	1		1	1	1		1	2	1	1			1	2		2	2
EE1208.6					1			1	1	1						2	2
EE1208.7	1		1		1		1	1	2	1						1	1
EE1208.8			1	1	1		1	1	1	1				1		2	2

Course Code : EE1114

Course Name : Power System-II

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

EE1114.1. Develop the computational models for Power system analysis including per unit system and stability.

EE1114.2. Analyze the performance of power system under symmetrical and unsymmetrical fault conditions.

EE1114.3. Evaluate the model of power system components during normal and fault conditions.

EE1114.4. Evaluate the power system dynamics and its stability during normal and abnormal conditions according to IEEE standards.

EE1114.5. Assess the different methods of control and compensation to choose the best option so that social and environmental problems are minimized and recognize the need to continuously follow the advancements in technology and incorporate them in the present system to improve efficiency and increase the flexibility and quality of operation.

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
ES1114.1	2	1			1	1	1	1					1			1	1
ES1114.2	1				1	1	1	1					1			1	1
ES1114.3					1	1	1	2	1	1			1			1	1
ES1114.4		1		1	3	1	1	1	1							1	1
ES1114.5		1	1		1	1	1	1	1	1	1	1	1	2	2	2	1

Course Code : EE1115

Course Name : Digital Signal Processing

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

EE1115.1. Analyze the various classifications & operations on signals
EE1115.2. Analyze the frequency & time domain representations of signals
EE1115.3. Implement fast Fourier transforms on signals
EE1115.4. Implement discrete time systems
EE1115.5. Analyze and solve problems using z transform
EE1115.6. Implement digital filter design techniques
EE1115.7. Implement IEEE standards for efficient signal processing

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
EE1115.1					2			2	1	1						2	1
EE1115.2								1	1	1						2	1
EE1115.3					1	1		1	1	1						2	1
EE1115.4					2	1	1	1	1	1						2	2
EE1115.5							1	1	1	1		1				2	1
EE1115.6						1	1	1	1	1		1		1		2	1
EE1115.7	1		2	2	1		1	1	1	1		1	2	2		2	2

Course Code : CC1106

Course Name : Critical Thinking for Decisions at Workplace

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