ER.PERUMAL MANIMEKALAI COLLEGE OF ENGINEERING

DEPARTMENT OF ELCTRICAL AND ELECTRONICS ENGINEERING

REGULATION: 2017

S.NO	COURSE NAME	COURSE OUT COMES	
1	C101 -Communicative English	C101.1	Enable the development in sharing information about family and friends.
		C101.2	Strengthen general comprehending skills and present lucid skills in free writing
		C101.3	Understand the basic grammar techniques and utilize it in enhancing language development.
		C101.4	Foster an environment for reading and develop good language skills
		C101.5	Develop flair for any kind of writing with rich vocabulary and proper syntax
2	C102 - Engineering Mathematics – I	C102.1	Diagonalize symmetric matrices and similar matrices using Eigen values and Eigen vectors.
		C102.2	Explain gradients, potential functions, and directional derivatives of functions of several variables.
		C102.3	Compute line, surface and volume integral using Gauss divergence, Green's and stoke's theorem.
		C102.4	Discuss analytic functions in heat and fluid flow
		C102.5	Extend the concept of contour integrals in evaluating Real integrals and Discuss Laplace Transform methods to solve initial value problems for constant coefficient linear ODEs.
3	C103 - Engineering Physics	C103.1	Discuss the Young's modulus and Rigidity modulus of elasticity of materials and its determination through experimental methods
		C103.2	Describe the characteristics of laser light and their application in semiconductor laser.
		C103.3	Discuss the principle behind the propagation of light through an optical fiber and its application in sensors
		C103.4	Summarize the different modes of heat transfer.
		C103.5	Relate the quantum concepts in electron microscopes and Describe the unit cell characteristics and the growth of crystals.
4	ering Chemistry	C104.1	Summarize the water related problems in boilers and their treatment techniques.
		C104.2	Discuss the applications of adsorption in the field of water and air pollution abatement.
		C104.3	Discuss the types of catalysis and the mechanism of enzyme catalysis

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4	C104 - Engine	C104.4	Associate phase rule in the alloying and the behavior of one component and two component systems using phase diagram
		C104.5	Explain various types of fuels, their manufacturing processes and calculation of calorific theoretically and Summarize the principles and generation of energy in batteries ,nuclear reactors, solar cells, wind mills and fuel cells
5	C105 - Problem Solving & Python Programming	C105.1	Develop algorithmic solutions to simple computational problems
		C105.2	Design a structure for a simple Python programs for solving problems.
		C105.3	Analyze and decompose a python programs into functions
		C105.4	Represent compound data using Python lists, Tuples, Dictionaries.
		C105.5	Design Command line file programs and apply exception handling mechanisms
6	C106 - Engineering Graphics	C106.1	Discuss about conics and orthographic views of engineering components
		C106.2	Draw the projection of points, lines and planes
		C106.3	Classify solids and projection of solids at different positions
		C106.4	Show sectioned view of solids and development of surface
		C106.5	Draw isometric projection and perspective views of an object/solid and Apply the concept of drawing in practical applications.
7	C107 - Problem Solving and Python Programming Laboratory	C107.1	Develop solutions to simple computational problems using Python programs
		C107.2	Solve problems using conditionals and loops in Python.
		C107.3	Develop Python programs by defining functions and calling them.
		C107.4	Use Python lists, tuples & dictionaries for representing compound data.
		C107.5	Develop Python programs using files.
8	neering Physics & Chemistry Lab	C108.1	Analyze the various modulus of elasticity of different types of materials.
		C108.2	Able to find the velocity of ultrasonic waves in different liquid.
		C108.3	Understand the various parameter affecting the thermal conductivity of poor conductor
		C108.4	Understand the concept of Laser and its diffraction for different usage
		C108.5	Analyze the acceptance angle and numerical aperture of optical fibers.

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	C108 - Engir	C108.6	Understand the method of determine the strength of a pure acid and mixture of acids by using conductivity meter.
		C108.7	Understand the method of estimate the amount of iron content present in a given solution by means of potentiometric titration.
9	C109 - Technical English	C109.1	Read technical texts and write area specific texts effortlessly
		C109.2	Write formal letters / emails using vocabulary.
		C109.3	Speak appropriately and effectively in varies formal and informal contexts.
		C109.4	Prepare reports and winning job applications.
		C109.5	Listen and comprehend lectures in the area of specialization successfully.
10	C110 - Engineering Mathematics - II	C110.1	Understand the Concepts of Diagonalization of matrices.
		C110.2	Understand the concepts of Vector Calculus and their applications.
		C110.3	Interpret the Concepts of analytic functions and Conformal mapping.
		C110.4	Understand the integration concepts on Complex integration
		C110.5	Demonstrate the concepts of Laplace transformations and their applications
11	C111 - Physics for Electronics engineering	C111.1	Gain knowledge on classical and quantum electron theories sand energy bond structure
		C111.2	Acquire knowledge on basics of semiconductor physics and its application in various devices
		C111.3	Get knowledge on magnetic and dielectric properties of materials
		C111.4	Have the necessary understanding on the functioning of optical materials for optoelectronics
		C111.5	Understand the basics of quantum structure and their application in spintronics and electronics
12	2 - Basic Civil and Mechanical Engineering	C112.1	Appreciate civil and mechanical engineering component of projects
		C112.2	Explain the usage of construction material and proper selection of construction materials
		C112.3	Measure distance and area by surveying
		C112.4	Identify the components used in power plant cycle
		C112.5	Demonstrate the working principle of petrol and diesel engine

S.NO	COURSE NAME	COURSE OUT COMES	
	C11	C112.6	Elaborate the components of refrigeration and air-conditioning cycle
13	C113 - Circuit Theory	C113.1	Ability to analyze electrical circuit
		C113.2	Ability to apply the circuit theorem
		C113.3	Ability to analyze Transients
14	C114 - Environmental Science & Engg	C114.1	Understand the types, characteristics of Ecosystem & Biodiversity.
		C114.2	Understand the types of pollution & its causes.
		C114.3	Understand the importance of Natural Resources.
		C114.4	Understand the Environmental problems.
		C114.5	Explain the importance of women, child education and HIV /AIDS.
15	C115 - Engineering Practices Laboratory	C115.1	Apply the knowledge of pipeline connections to household fittings and industrial buildings.
		C115.2	Prepare the different joints in roofs, doors, windows and furniture.
		C115.3	Perform step turning operation in a lathe.
		C115.4	Perform the various welding processes and know about its applications.
		C115.5	Produce a funnel using sheet metal.
16	C116 - Electric Circuits Laboratory	C116.1	Understand and apply the circuit theorem and concepts in engineering application
		C116.2	Simulate electric circuits
17	C201- Transforms and Partial Differential Equations	C201.1	Apply various techniques in solving the partial differential equations.
		C201.2	Evaluate the Fourier Series using the different methods of integral.
		C201.3	Analyze the application of partial differential equations in a large number of engineering subjects like heat conduction and wave equations
		C201.4	Apply integration techniques to formulate the Fourier transforms.
		C201.5	Apply Z - transforms and Difference equations to solve some of the engineering problems.
	ogic Circuits	C202.1	Understanding of the fundamental concepts and techniques used in digital electronics
		C202.2	Illustrate the combinational logic circuit using different simplification technique

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18	C202- Digital Lo	C202.3	Design the synchronous sequential circuit
		C202.4	Understand the design of asynchronous sequential circuit, hazards and programmable logic circuits
		C202.5	Impact the knowledge to build and troubleshoot digital circuits using VHDL
19	C203- Electromagnetic Theory	C203.1	Understand the basic mathematical concepts related to electromagnetic vector fields.
		C203.2	Interpret the concepts of Electrostatic fields and apply boundary conditions on Electrostatic field.
		C203.3	Develop concepts of magneto static fields, magnetic flux density, vector potential and its applications.
		C203.4	Determine relationship between the Time Varying Electric and Magnetic Field
		C203.5	Understand and compute Electromagnetic fields and apply them for design and analysis of electrical equipment and systems
20	C204- Electrical Machines – I	C204.1	Ability to analyze the magnetic-circuits.
		C204.2	Ability to acquire the knowledge in constructional details of transformers
		C204.3	Ability to understand the concepts of electromechanical energy conversion.
		C204.4	Ability to acquire the knowledge in working principles of DC Generator.
		C204.5	Ability to acquire the knowledge in working principles of DC Motor
21	C205- Electron Devices and Circuits	C205.1	Understanding the basic concepts of various PN junction diodes and its applications.
		C205.2	Understanding the structure, operation and characteristics of various types of transistors.
		C205.3	Analysis of various types of FET and BJT amplifiers.
		C205.4	Imparting the operation of multistage and differential amplifiers.
		C205.5	Study and analysis of feedback amplifiers and oscillators.
22	Plant Engineering	C206.1	Explain the layout, construction and working of the components inside a thermal power plant
		C206.2	Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.
		C206.3	Explain the layout, construction and working of the components inside nuclear power plants

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	C206- Power	C206.4	Explain the layout, construction and working of the components inside Renewable energy power plants
		C206.5	Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production
23	C207- Electronics Laboratory	C207.1	Distinguish the performance of PN junction diode and zener diode
		C207.2	Locate the various operating regions of BJT using the input and output characteristics
		C207.3	Draw the characteristics of electron devices and analyze their performance
		C207.4	Design and analyse the performance of amplifier and oscillator circuits
		C207.5	Demonstrate the working of rectifier circuits in both hardware and software
24	C208- Electrical Machines – I Laboratory	C208.1	Able to Interpret the performance of the DC generator for different condition.
		C208.2	Compare the performance of DC Machine(Shunt,Series&Compound)
		C208.3	Apply and analysis the suitable test on single phase transformer evaluate the performance.
		C208.4	Enumerate the significance of given DC machine and transformer using predetermine test.
		C208.5	Compare and analysis the impact of starter and three phase transformer connection.
25	C209- Numerical Methods	C209.1	Determine the solution of algebraic and transcendental system of linear equations
		C209.2	To interpolate the values of unknown functions using Newton's Formula
		C209.3	Estimate the numerical values of the derivatives and integrals of unknown function
		C209.4	Solve first and second order initial value problem
		C209.5	Solve Numerically boundary value problem
	lachines – II	C210.1	Understand construction, Principle of operation and performance of synchronous machine.
		C210.2	Understand construction, Principle of operation and performance of Synchronous motor.

S.NO	COURSE NAME	COURSE OUT COMES	
26	C210 - Electrical M	C210.3	Acquire knowledge about the constructional details and principle of operation of three phase and induction motors.
		C210.4	Describe the starting and speed control of three phase induction motors.
		C210.5	Explain the construction, principle of operation and performance of single phase induction motors and special machines.
27	C211- Transmission and Distribution	C211.1	Explain the structure of power system and various distribution methods
		C211.2	Describe and analyze the transmission elements in power system network
		C211.3	Summarize the modeling of transmission and distribution system and its performance
		C211.4	Apply the basic concepts for performance evaluation of various insulator and cables
		C211.5	Compare the mechanical design of transmission system and earthing techniques
28	C212 - Measurements and Instrumentation	C212.1	Describe the basic functional block elements in different measuring Instruments
		C212.2	Explain the operation of instruments for the measurement of electrical and magnetic parameters
		C212.3	Design the various bridge circuits for the measurement of electrical quantities
		C212.4	Able to explain the construction and working principle of various types of storage and display devices
		C212.5	Compare the various types of transducers and its functions in data acquisition systems
29	C213- Linear Integrated Circuits and Applications	C213.1	To gain knowledge in IC fabrication procedure.
		C213.2	Ability to analysis the DC and AC characteristics of operational amplifiers and its effect on output and their compensation techniques.
		C213.3	To Understand and acquire knowledge on design of linear and non-linear applications of an op amp
		C213.4	Explain and compare the working of multivibrators using special application IC 555 and general purpose opamp-IC-566 VCO, 565 PLL and AD633 Analog multiplier
		C213.5	Illustrate the function of application specific ICs such as Voltage regulators, Instrumentation Amplifier & function generator.
30	Control Systems	C214.1	Explain the uses of transfer function models for analyzing physical systems and relate the control system components.
		C214.2	Develop adequate knowledge in the time response of systems, steady state error analysis. And also to build the basics concept of controllers, root locus for stability studies.
		C214.3	Distinguish the basic knowledge in obtaining the open loop and closed–loop frequency responses of systems

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	C214 -	C214.4	Evaluate the basics of stability studies by various techniques and design of compensator using frequency response analysis
		C214.5	Demonstrate the concept of state variable analysis to evaluate the feedback control and the concept of Controllability, observability using state space representation
31	C215- Electrical Machines Laboratory – II	C215.1	The ability to conduct testing and experimental procedures on different types of electrical machines
		C215.2	Students will be able to use modeling parameters with standard equivalent circuit models to predict correctly the expected performance of various general purpose electrical machines
		C215.3	Ability to prepare professional quality graphical presentations of laboratory data and computational results, incorporating accepted data analysis and synthesis methods
		C215.4	Students will work in teams to conduct experiments, analysis results and develop technically sound reports of outcomes
		C215.5	Primarily via team based laboratory activities, students will demonstrate the ability to interact effectively on a social and interpersonal level with fellow students, and will demonstrate the ability to divide up and share task responsibilities to complete assignments
32	C216 - Linear and Digital Integrated Circuits Laboratory	C216.1	Ability to understand and implement Boolean Function
		C216.2	Design and test various combinational & sequential logic circuits and systems
		C216.3	To acquire knowledge on code conversion & shift registers.
		C216.4	To acquire knowledge on Application of Op-Amp.
		C216.5	Analysis and design various Flip-flop, counters & voltage regulator using specific IC.
33	C217- Technical Seminar	C217.1	Ability to review, prepare and present technological developments
		C217.2	Ability to face the placement interviews
		C217.3	Achieve international examination such as IELTS and TOEFL
		C217.4	Improve the fluency in spoken English and improve in leadership trait.
		C217.5	Identify their creativity and critical thinking while communicating with others.
35	er System Analysis	C301.1	Model the power system components and form the Y-bus matrix.
		C301.2	Solve the load flow problem by applying numerical methods.
		C301.3	Calculate the fault current, post fault voltage and short circuit capacity of power system during symmetrical fault condition.

S.NO	COURSE NAME	COURSE OUT COMES	
	C301 - Powe	C301.4	Draw the sequence network of given power system and calculate the fault parameters during unsymmetrical fault condition.
		C301.5	Classify different types of stability and to model and analyze the transient behavior of power system when it is subjected to a fault.
36	C302 - Microprocessors and Microcontrollers	C302.1	Describes the architecture of 8085 processor.
		C302.2	Outline the concepts of addressing modes and different types of instruction.
		C302.3	Explains the basic concepts of 8051 architecture and registers.
		C302.4	Interfacing of IC s with 8051 and 8085 microprocessor.
		C302.5	Programming of 8051 and different addressing modes of 8051 and stepper motor interface.
37	C303 - Power Electronics	C303.1	Analyze the characteristics of different power electronics devices like SCR, BJT, MOSFET and IGBT.
		C303.2	Explain the types of power converters and understand the operations of single and three phase converters.
		C303.3	Classify the operation of Choppers and outline the application of SMPS.
		C303.4	Categorize various single phase and three phase power inverter circuits and understand their applications
		C303.5	Illustrate the basic operation and characteristics of AC voltage controllers and cyclo converters
38	C304 - Digital Signal Processing	C304.1	Understanding the Classification of signals and systems & their mathematical representation.
		C304.2	Analyzing the discrete time systems.
		C304.3	Applying various transformation techniques & their computation.
		C304.4	Implementing filters and their design for digital implementation.
		C304.5	Understanding about a programmable digital signal processor & quantization effects
39	5 - Object Oriented Programming	C305.1	To understand the basic Object Oriented concepts.
		C305.2	To Develop solutions to given problems using class and object concepts.
		C305.3	Ability to Develop Application to given problems using Inheritance and Exception in C++.
		C305.4	To understand basics of java programs using class, method and objects.

S.NO	COURSE NAME	COURSE OUT COMES	
	C30	C305.5	To apply the concept of Multithreading and Construct java programs using exception Handling and IO Classes.
40	C306 - Sensors and Transducer	C306.1	Students will expertise in various calibration technique and signal type for sensor
		C306.2	Apply the various sensor in automotive and mechatronics application
		C306.3	To understand the various sensors used to measure various physical parameters.
		C306.4	Ability to understand the basics principle of various smart sensor
		C306.5	To acquire knowledge on DAQ system with different for real time application
41	C307 - Control and Instrumentation Laboratory	C307.1	Evaluate performance of P, PI and PID controllers and compensator
		C307.2	Model the parameters to predict correctly the expected Performance of various general-purpose Modeling of Systems, Machines, Sensors and Transducers
		C307.3	Synthesis the methods of Design of Lag, Lead and Lag-Lead Compensators.
		C307.4	To conduct experiments, analyze results, and develop technically sound reports of outcomes.
		C307.5	Demonstrate the ability to interact effectively on a social and interpersonal level.
42	C308 – Professional Communication	C308.1	Formulate presentations and Participate in Group Discussions.
		C308.2	Prepare to answer the questions in interviews.
		C308.3	Achieve international examination such as IELTS and TOEFL
		C308.4	Improve the fluency in spoken English and improve in leadership trait.
		C308.5	Identify their creativity and critical thinking while communicating with others.
43	C309 – Object Oriented Programming Laboratory	C309.1	Gain the basic knowledge on object oriented concepts.
		C309.2	Ability to develop applications using object oriented programming concepts.
		C309.3	Ability to implement features of object oriented programming to solve real world problems.
		C309.4	To implement features of object oriented programming using java.
		C309.5	Perform multitasking process using java application.
		C310.1	Ability to explain about steady state and dynamic operation of motor load system and apply the multi quadrant dynamics in hoist load system.

S.NO	COURSE NAME	COURSE OUT COMES	
44	C310 – Solid State Drives	C310.2	Analyze the single phase, three phases fully controlled converter and Chopper fed Separately excited dc motor drives using steady state analysis and discuss the various controls Strategies of Converter.
		C310.3	Ability to explain the operation and characteristics of various methods of solid state speed Control of induction motor.
		C310.4	Describe the operation of various control modes of synchronous motor drives
		C310.5	Design a current and speed controller and develop the transfer function for DC motor, load and converter, closed loop control with current and speed feedback
45	C311 – Protection andSwitchgear	C311.1	Gain the basic knowledge on object oriented concepts.
		C311.2	Ability to develop applications using object oriented programming concepts.
		C311.3	Ability to implement features of object oriented programming to solve real world problems.
		C311.4	To implement features of object oriented programming using java.
		C311.5	Perform multitasking process using java application.
46	C312 – Embedded Systems	C312.1	Explain the architecture, ISA, programming, and interface requirements of a commercially 32-bit microprocessor
		C312.2	Analyze and design to interface a microprocessor to displays, memories, ports, serial ports (USART, SPI, and I2C), etc.
		C312.3	Learn to use assemblers, compilers, simulators and emulators to help with design and verification for ARM processors.
		C312.4	Apply 32-microprocessor systems (ARM) to solve real-time problems like timers, counters etc.,
		C312.5	Design Linux based real time embedded systems
47	C313 – Design of Electrical Apparatus	C313.1	Discuss the properties of materials used in electrical and determine heat dissipation due to thermal.
		C313.2	Design the main dimensions and winding details of DC machines.
		C313.3	Design the overall dimensions and parts of single phase and three phase transformer and cooling system
		C313.4	Develop output equation of AC machines, design stator and rotor of induction machines.
		C313.5	Design stator and rotor of synchronous machines and design field systems for turbo alternators.
	nd	C314.1	analyze the characteristics and functions of relays

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48	C314 – protection and switchgear	C314.2	understand and analyze Electromagnetic relays
		C314.3	analyze the functions of relay protection schemes
		C314.4	study about the comparators and apparatus protection using static and numerical relays
		C314.5	acquire knowledge on functioning of circuit breaker
49	C315– Power Electronics and Drives Laboratory	C315.1	Plot the VI characteristics of SCR, TRIAC, MOSFET and IGBT and also generate the Gate Pulse using R, RC and UJT.
		C315.2	Draw the output response of single phase AC to DC half and fully controlled converter and step up and step down MOSFET based chopper.
		C315.3	Draw the output response of single phase and three phase IGBT based PWM inverter.
		C315.4	Plot the output response of AC voltage controller and switch mode power converter.
		C315.5	Simulate the Power Electronic Circuits.
50	C316 – Microprocessors andMicrocontrollersLaboratory	C316.1	Demonstrate knowledge and understanding of the programme using instruction sets of processors.
		C316.2	Convert the code, analog input to digital and to control traffic signals using 8085 processor.
		C316.3	Demonstrate knowledge and understanding the program for interfacing stepper motor and display controller using 8 bit processor
		C316.4	Manipulate the basic operations involved in jump and looping in 8051 microcontroller.
		C316.5	Understand the program for D/A interfacing and serial port communication based on 8051 microcontroller
51	C317 – Mini Project	C317.1	Identify the real world problems of electrical engineering.
		C317.2	Understand the working of various models in the electrical engineering systems.
		C317.3	Apply the principles of electrical engineering in the real world systems.
		C317.4	Criticize and experiment to arrive at solution for the electrical engineering problems.
		C317.5	Explain the solution by effective presentation and involved active member in the team leads to lifelong learning.