



NPR

COLLEGE OF ENGINEERING AND TECHNOLOGY

(AN AUTONOMOUS INSTITUTION)

NBA Accredited (B.E. - CSE, ECE, EEE & Mechanical Engg.) | Accredited by NAAC with 'A' Grade | Recognized by UGC under 2 (f)
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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Programme Outcomes and Course Outcomes for All Programmes Offered by the Institution-Regulation 2023

S.No	Content	Page no.
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Faculty In-charge

Hod/EEE

Directors Academics

Principle

Course Code & Title:

As per NPRCET Regulation 2023, the lists of courses are given in the following table.

Table-List of Courses with Course Code:

S. No	Course code (NBA)	Course Code (NPRCET)	Title of the course
1st Semester			
1	C101	23HS101	Professional English -I
2	C102	23MA101	Matrices and Calculus
3	C103	23PH101	Engineering Physics
4	C104	23CY101	Engineering Chemistry
5	C105	23GE101	Problem Solving and C Programming
6	C106	23GE103	தமிழர்மரபு/Heritage of Tamils
7	C107	23BS111	Physics and Chemistry Laboratory
8	C108	23GE112	English Laboratory I
2nd Semester			
09	C109	23HS201	Professional English -II
10	C110	23MA202	Transforms and Numerical Methods
11	C111	23PH202	Physics for Electrical Engineering
12	C112	23BE203	Basics of Civil and Mechanical Engineering
13	C113	23GE202	Engineering Graphics
14	C114	23EE201	Analysis of Electric Circuits
15	C115	23GE201	தமிழரும் தொழில்நுட்பமும் Tamils and Technology
16	C116	23GE211	Engineering Practices Laboratory
17	C117	23EE211	Electric Circuits Laboratory
18	C118	23GE212	English Laboratory II
3rd Semester			
19	C119	23MA901	Probability and Statistics
20	C120	23CS304	Programming in Python
21	C121	23EE301	Electromagnetic Field Theory
22	C122	23EE302	Measurements and Instrumentation

23	C123	23EE303	Electron Devices and Circuits
24	C124	23EE304	DC Machines and Transformers
25	C125	23EE311	DC Machines and Transformers Laboratory
26	C126	23EE312	Electronic Devices and Circuits Lab
27	C127	23GE311	Professional Development
28	C128	23EEA01	Value Added Courses I
4th Semester			
29	C129	23GE901	Environmental Sciences and Sustainability
30	C130	23EE401	Control Systems Engineering
31	C131	23EE402	Transmission and Distribution
32	C132	23EE403	Linear Integrated Circuits and Applications
33	C133	23EE404	Digital Logic Circuits
34	C134	23EE405	Synchronous and Induction Machines
35	C135	23EE411	Synchronous and Induction Machines Laboratory
36	C136	23EE412	Control and Instrumentation Laboratory
37	C137	23EEA02	Value Added Courses II
5th Semester			
38	C138	23EE501	Power System Analysis
39	C139	23EE502	Power Electronics
40	C140	23EE503	Embedded Systems and IOT
41	C141	23PEE10	Special Electrical Machines
42	C142	23OME01	Energy conservation and management
43	C143	23EE511	Power System Simulation Laboratory
44	C144	23EE512	Power Electronics Laboratory
45	C145	23EE513	Internship I
6th Semester			
46	C146	23EE601	Power system protection and Switchgear
47	C147	23EE602	Power System Operation and Control
48	C148	23EE611	Mini project
49	C149	23PEE13	Electrical drives
50	C150	23PEE21	Smart System Automation
51	C151	23PEE07	Smart Grid
52	C152	23MC904	History of science and technology in India



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S. No	Course code (NBA)	Course Code (NPRCET)	Title of the course
53	C153	23OHS02	Project report writing
8 th Semester			
54	C154	23EE811	Project Work



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COURSE OUTCOMES WITH K – LEVEL **(REGULATION – 2023)**

Course Outcomes with K-Level mapping for all courses



Course Code & Title: C101 & 23HS101 Professional English-I		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C101.1	Use appropriate words in a professional context and communicate in a professional context.	K3
C101.2	Gain understanding of basic grammatical structures and use the min right context.	K2
C101.3	Read and infer the denotative and connotative meanings of technical texts and use technical words in describing products with appropriate definitions.	K3
C101.4	Write definitions, descriptions, narrations and essays on various topics.	K6
C101.5	Express their opinions effectively in both oral and written medium of communication.	K6

Course Code & Title: C102 & 23MA101 Matrices and Calculus		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C102.1	Use the matrix algebra methods for solving practical problems.	K3
C102.2	Able to use differential calculus ideas on several variable functions.	K3
C102.3	Apply integral calculus and multiple integral tools in solving various application problems.	K3
C102.4	Understand the concepts of Gradient, divergence and curl of a vector point function and related applications.	K2
C102.5	Apply various techniques in solving ordinary differential equations.	K3

Course Code & Title: C103 & 23PH101 ENGINEERING PHYSICS		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C103.1	Choose the correct materials based on their qualities for any intended applications and learn the basics of elasticity and its engineering-related applications.	K3
C103.2	Express their knowledge in electromagnetic waves.	K2
C103.3	Infer the characteristics of laser for various Engineering applications and expand the understanding of optical fibers use in communications.	K2
C103.4	Apply quantum theory's sophisticated physics notions to the matter characterization.	K3
C103.5	Know the fundamentals of crystal formations and growth methods.	K2

Course Code & Title: C104 & 23CY101 ENGINEERING CHEMISTRY		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C104.1	Summarize the water related problems in boilers and their treatment techniques.	K1
C104.2	Discuss the applications of nanomaterials in medicine, agriculture, energy, electronics and catalysis.	K2
C104.3	Discuss the types, properties and applications of polymers and composites.	K3
C104.4	Summarize the fuels used for engineering processes and applications fuels.	K2
C104.5	Summarize the principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.	K3



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Course Code & Title: C105 & 23GE101 PROBLEM SOLVING AND C PROGRAMMING		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C105.1	Understand the basic concepts of C programming tokens, control statements Input/Output statements, and Preprocessor directives	K2
C105.2	Develop C Programs using basic programming constructs for solving simple problems	K3
C105.3	Develop C programs for solving computational problems by using arrays and strings	K3
C105.4	Develop simple real-time applications in C using functions, arrays, and strings	K3
C105.5	Develop applications for real time problems in C using pointers and structures	K3

Course Code & Title: C106 & : 23BS111 PHYSICS LABORATORY		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C106.1	Apprehend the concepts of interference, diffraction of light and recognize the resonance concept of waves.	K2
C106.2	Apply the principles of operations of optical fibers, semiconductor using simple circuits and interaction of electromagnetic waves and crystalline solids.	K3
C106.3	Measure the elastic moduli and moment of inertia of given materials with the help of suggested procedures.	K3
C106.4	Experiment the relationship between the light and matter & properties of liquids.	K4
C106.5	Estimate the velocity of sound and compressibility of liquid.	K2



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Course Code & Title: C106 & : 23BS111 CHEMISTRY LABORATORY		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C106.1	Analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO.	K4
C106.2	Determine the amount of metal ions through volumetric and spectroscopic techniques.	K3
C106.3	Analyse and determine the composition of alloys.	K4
C106.4	Learn simple method of synthesis of nanoparticles	K2
C106.5	Quantitatively analyse the impurities in solution by electroanalytical methods.	K4

Course Code & Title: C107 & : 23GE112 ENGLISH LABORATORY –I		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C107.1	To listen to and comprehend general as well as complex academic information.	K2
C107.2	To listen to and understand different points of view in a discussion.	K2
C107.3	To speak fluently and accurately in formal and informal communicative contexts.	K3
C107.4	To describe products and processes and explain their uses and purposes clearly and accurately.	K6
C107.5	To express their opinions effectively in both formal and informal discussions.	K6

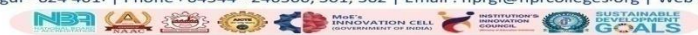


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SEMESTER II

Course Code & Title: C108 & 23HS201 PROFESSIONAL ENGLISH - II		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C108.1	To compare and contrast products and ideas in technical exits and write analytical essays.	K2
C108.2	To identify and report cause and effects in events, industrial processes through technical texts and draft a report with suggestions.	K6
C108.3	To analyze problems in order to arrive at feasible solutions and communicate the min the written format.	K4
C108.4	To present their ideas and opinions in a planned and logical manner in industrial nature.	K6
C108.5	To draft effective resumes in the context of job application.	K6

Course Code & Title: C109 & 23MA202 TRANSFORMS AND NUMERICAL METHODS		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C109.1	To apply Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.	K3
C109.2	To understand general periodic functions and apply in problems of Fourier series, which are sums of sines and cosines.	K2
C109.3	To use the Fourier transform as the tool to connect the time domain and frequency domain in signal processing.	K3
C109.4	Understand the basic concepts and Techniques of solving algebraic and transcendental equations.	K2



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C109.5	Solve the ordinary differential equations with initial conditions by using certain techniques with engineering applications.	k4
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Course Code & Title: C110 & 23PH202 PHYSICS FOR ELECTRICAL ENGINEERING		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C110.1	To understand about the creation of energy band structures, free electron theory, and quantum theory and gain knowledge about magnetic materials and its applications.	K2
C110.2	To evaluate the functions of semiconductors and their uses.	K2
C110.3	To apply the knowledge of dielectric materials, as well as the applications.	K3
C110.4	To understand about the uses of superconducting and Optical properties materials.	K2
C110.5	To describe the basic principles behind the operation of nano electronic devices.	K2

Course Code & Title: C111 & 23BE203 & BASICS OF CIVIL AND MECHANICAL ENGINEERING		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C111.1	Understanding profession of Civil and Mechanical engineering.	K2
C111.2	Illustrate the Basics in surveying and material used in construction.	K2
C111.3	Summaries the planning of building, infrastructure and Building components	K3
C111.4	Illustrate working principles of IC Engine, different types of power plant and turbines.	K3
C111.5	Elaborate the components and working principles of Refrigeration and Air conditioning system.	K3



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Course Code & Title: C112 & 23GE202 ENGINEERING GRAPHICS		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C112.1	Construct the conic curves, involutes and cycloid.	K3
C112.2	Solve practical problems involving projection of lines, points and plane surfaces	K3
C112.3	Draw orthographic projection of solids and freehand sketch of simple objects.	K3
C112.4	Draw the sectioning and development of simple solids.	K3
C112.5	Draw isometric and perspective projections of simple solids	K3

Course Code & Title: C113 & 23EE201 ANALYSIS OF ELECTRIC CIRCUITS		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C113.1	Explain circuit's behavior using circuit laws.	K2
C113.2	Apply mesh analysis/ nodal analysis / network theorems to determine behavior of the given DC and AC circuit.	K2
C113.3	Compute the transient response of first order and second order systems to step and sinusoidal input.	K3
C113.4	Compute power, line/ phase voltage and currents of the given three phase circuit.	K3
C113.5	Comprehend the frequency response of series and parallel RLC circuits.	K2



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Course Code & Title: C114 & 23GE211 ENGINEERING PRACTICES LABORATORY		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C114.1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.	K3
C114.2	Wire various electrical joints in common household electrical wire work.	K3
C114.3	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.	K3
C114.4	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.	K4
C114.5	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.	K3

Course Code & Title: C115 & 23EE211-ELECTRIC CIRCUITS LABORATORY		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C115.1	Use simulation and experimental methods to verify the fundamental electrical laws for the given DC/AC circuit (Ex 1)	K3
C115.2	Use simulation and experimental methods to verify the various electrical theorems (Superposition, Thevenin's, Norton and maximum power transfer) for the given DC/AC circuit (Ex 2-5)	K3
C115.3	Analyze transient behavior of the given RL/RC/RLC circuit using simulation and experimental methods (Ex 6)	K3
C115.4	Analyze frequency response of the given series and parallel RLC circuit using simulation and experimentation methods (Ex 7-8)	K4



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C115.5	Analyze the performance of the given three-phase circuit using simulation and experimental methods (Ex 9)	K3
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Course Code & Title: C116 & 23GE212 -ENGLISH LABORATORY –II		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C116.1	Speak effectively in group discussions held in a formal/semi formal contexts.	K6
C116.2	Discuss, analyze and present concepts and problems from various perspectives to arrive at suitable solutions.	K4
C116.3	Make effective presentations in an attractive way using appropriate vocabulary.	K3
C116.4	Attend job interviews and be successful in them.	K6
C116.5	Develop adequate Soft Skills required for the workplace.	K3

SEMESTER III

Course Code & Title: C117 & 23MA901 PROBABILITY AND STATISTICS		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C117.1	Understand the fundamental knowledge of the concepts of probability	K2
C117.2	Understand the fundamental knowledge of standard distributions which can describe real life phenomenon.	K2



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C117.3	Understand the basic concepts of two-dimensional random variables and apply in engineering applications.	K2
C117.4	Apply the concept of testing of hypothesis for small and large samples in real life problems.	K3
C117.5	Apply the basic concepts of classifications of design of experiments in engineering field.	K3
Course Code &Title: C118 & 23CS304 PROGRAMMING IN PYTHON		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C118.1	Comprehend and use Python data types, expressions, and statements to create simple programs.	K2
C118.2	Implement Python programs that solve real-time computational problems using conditionals, loops, functions, and strings.	K3
C118.3	Understand and use compound data types such as lists, tuples, and dictionaries in Python to manage and manipulate collections of data.	K2
C118.4	Implement Python programs that solve computational problems by using modules, file handling techniques, and Python packages.	K3
C118.5	Implement Python programs that solve computational problems by incorporating exception handling mechanisms and leveraging advanced libraries.	K3

Course Code &Title: C119 & 23EE301 ELECTROMAGNETIC FIELD THEORY		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C119.1	Identify and implement an appropriate coordinate system for the given electromagnetic problem	K2
C119.2	Apply concepts of electrostatics for applications related to electric fields	K3
C119.3	Apply concepts of magneto statics for applications related to magnetic fields	K3
C119.4	Understand the basic concepts of electro dynamic fields and explain the Maxwell equations	K2



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C119.5	Comprehend and analyze the major applications of electromagnetic waves	K4
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Course Code & Title: C120 & 23EE302 MEASUREMENTS AND INSTRUMENTATION		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C120.1	Interpret the functions of instrumental elements, characteristics and evaluate the errors in the process.	K2
C120.2	Examine the construction, working principle and applications of moving coil, moving iron, induction type instruments and usage of instrument transformers	K2
C120.3	Select a suitable transducer for a given application and explain working of sensors	K3
C120.4	Choose suitable AC and DC bridge for measuring R, L, C and frequency for the required specifications	K3
C120.5	Explain the specifications, principle of operation, and applications of various Digital and Virtual Instruments	K2

Course Code & Title: C121 & 23EE303 ELECTRON DEVICES AND CIRCUITS		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C121.1	Understanding the characteristics of the p-n junction, the diode and some special function diodes and these diodes' application in electronic circuits	K2
C121.2	Analyze the structure and characteristics of BJT, FET, MOSFET and UJT.	K4
C121.3	Apply the performance of various configurations of BJT, MOSFET-based amplifier.	K3
C121.4	Apply the characteristics of MOS-based cascade and differential amplifier.	K3
C121.5	Apply the feedback amplifiers and various oscillators.	K3



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Course Code & Title: C122 & 23EE304 DC MACHINES AND TRANSFORMERS		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C122.1	Analyze the magnetic circuits & magnetic material and also the force / torque expressions of singly and multiple excited electromechanical energy conversion systems.	K4
C122.2	Explain the construction and working principle of DC Generator and its characteristics.	K2
C122.3	Interpret the working principles, starting, speed control methods and estimate various losses of DC Motors.	K3
C122.4	Understand the operation and characteristics of single-phase transformers and draw the equivalent circuit of transformer and also predetermine the efficiency and regulation.	K2
C122.5	Compute the efficiency and regulation of various test and describe the working principle of three phase transformers with different types of connections.	K4

Course Code & Title: C123 & 23EE311 DC MACHINES AND TRANSFORMERS LABORATORY		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C123.1	Construct the circuit with appropriate connections for the given DC machine/transformer (Ex 1- 12)	K2
C123.2	Experimentally determine the characteristics of different types of DC machines. (Ex 1-5)	K2
C123.3	Demonstrate the speed control techniques for a DC motor for industrial applications. (Ex 7)	K2
C123.4	Identify suitable methods for testing of transformer and DC machines. (Ex 6, 8,9,11)	K2
C123.5	Predetermine the performance parameters of transformers and DC motor (Ex 6, 10,12)	K2



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Course Code & Title: C124 & 23EE312 ELECTRONIC DEVICES AND CIRCUITS LABORATORY		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C124.1	Analyze the characteristics of PN junction diode, Zener diode experimentally (Ex 1)	K2
C124.2	Analyze the clipper and clamper circuits and characteristics of half-wave and full-wave rectifier with and without filters experimentally (Ex 2 & 3)	K2
C124.3	Analyze the characteristics of BJT in CE, CC, CB configuration experimentally. (Ex. 4)	K2
C124.4	Analyze the characteristics of JFET and UJT experimentally. (Ex 5 & 6)	K2
C124.5	Analyze frequency response characteristics of a common emitter amplifier and characteristics of FET based amplifier experimentally. (Ex 7 & 8)	K2

Course Code & Title: C125 & 23GE311 PROFESSIONAL DEVELOPMENT		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C125.1	Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements (Ex 1)	K2
C125.2	Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding. (Ex 2)	K2
C125.3	Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects. (Ex 3)	K2



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Course Code & Title: C126 & 23EEA01 MATLAB FOR ELECTRICAL ENGINEERING APPLICATIONS		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C126.1	Understand the basic principle of using features of MATLAB	K2
C126.2	Apply computing methods for solving a wide range of engineering problems.	K2
C126.3	Understanding of control engineering concepts	K2
C126.4	Use computer engineering software to solve and present problem solutions in a technical format.	K2

SEMESTER IV

Course Code & Title: C127 & 23GE901 ENVIRONMENTAL SCIENCES AND SUSTAINABILITY		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C127.1	recognize and understand the functions of environment, ecosystems and biodiversity and their conservation	K1
C127.2	Identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.	K2
C127.3	Identify the causes, effects of natural disasters and contribute to the preventive measures in the society.	K3
C127.4	Identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.	K2
C127.5	Demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.	K3



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Course Code & Title: C128 & 23EE401 Control Systems Engineering		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C128.1	Develop mathematical models of electrical, mechanical and Electromechanical systems	K3
C128.2	Analyze the time response of first-order and second-order systems and understand the characteristics of various controllers.	K4
C128.3	Analyze and assess the stability and performance of control systems using frequency response techniques such as Bode, Polar, and Nyquist plots.	K4
C128.4	Analyze system stability using various criteria and design compensators to enhance system performance using Bode plot methods.	K4
C128.5	Apply state space methods to model and analyze the behavior of linear systems, and assess system performance through controllability and observability criteria.	K3

Course Code & Title: C129 & 23EE402 TRANSMISSION AND DISTRIBUTION		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C129.1	Realize the structure of electric power system and line parameters.	K2
C129.2	Develop the transmission line and performance of line	K3
C129.3	Regulate the sag and improve the efficiency of the transmission lines.	K3
C129.4	Realize the underground cables, dielectric stress and grading of the cables.	K2
C129.5	Develop the advanced technologies of distribution systems.	K3



Course Code &Title: C130 & 23EE403 LINEAR INTEGRATED CIRCUITS AND APPLICATIONS		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C130.1	Explain the Linear Integrated Circuits fabrication techniques	K3
C130.2	Explain the working of operation amplifier and its characteristics.	K3
C130.3	Design linear circuits using operational amplifiers for the given specifications	K4
C130.4	Explain functional blocks, characteristics and applications of Timer, PLL, Analog multiplier ICs.	K3
C130.5	Explain the applications of ICs in instrumentation amplifier, fixed and variable voltage regulator.	K3

Course Code &Title: C131 & 23EE404 -DIGITAL LOGIC CIRCUITS		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C131.1	Analyze digital systems by applying concepts of number systems, Boolean algebra, logic gates, digital logic families, and circuit implementation technologies.	K4
C131.2	Design and the implementation of combinational circuit such as multiplexers and de multiplexers - code converters, adders, subtractors, Encoders and Decoders	K3
C131.3	Design various synchronous sequential circuits using Flip Flops	K4
C131.4	Design and analyze asynchronous sequential logic circuits, identify and mitigate hazards, and understand the functionality and importance of memory units like RAM and ROM.	K3
C131.5	Develop digital systems using programmable logic devices, Verilog HDL, and VLSI design methodologies, incorporating simulation examples for combinational and sequential circuits.	K4



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Course Code & Title: C132 & 23EE405 SYNCHRONOUS AND INDUCTION MACHINES		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C132.1	Understand the construction, operation, and performance characteristics of synchronous generators, including voltage regulation, synchronization, and load behavior, using analytical methods like EMF, MMF, and ZPF.	K2
C132.2	Understand the construction, operation, performance characteristics, and control methods of induction motors, including starting techniques.	K2
C132.3	Analyze the operation, starting methods, torque characteristics, and performance curves of synchronous motors.	K4
C132.4	Understand the construction, operation, and starting methods of single-phase induction motors.	K2
C132.5	Analyze the industrial applications and operational principles of AC generators and motors	K4

Course Code & Title: C133 & 23EE411 SYNCHRONOUS AND INDUCTION MACHINES LABORATORY		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C133.1	Analyze the regulation of three-phase alternators using different methods (EMF, MMF, ZPF, ASA) and evaluate their performance under various load conditions.(Ex 1, 2, 3)	K2
C133.2	Conduct load tests on alternators and induction motors (both three-phase and single-phase) with resistive, inductive, and capacitive loads, and interpret the results to assess motor efficiency and performance.(Ex 4,6,9)	K2
C133.3	Determine the performance characteristics of induction motors using circle diagrams and equivalent circuits, and predict their behavior under different loading conditions.(Ex 7)	K4



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C133.4	Investigate the separation of no-load losses in three-phase induction motors and apply testing methods such as the no-load and blocked rotor tests to assess motor efficiency. (Ex ,8)	K2
C133.5	Explore the operation of induction motor starters, including V and Inverted V curves of three-phase synchronous motors, and apply these tests to understand motor starting conditions and performance in industrial systems. (Ex 5,10)	K4

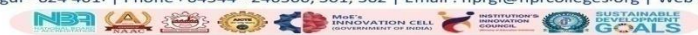
Course Code &Title: C134 & 23EE412 CONTROL AND INSTRUMENTATION LABORATORY		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C134.1	Model and analyze simple physical systems and simulate the performance in analog and digital platform.	K2
C134.2	Model mechanical and electrical systems, simulate their behavior, and derive transfer functions from experimental data.	K2
C134.3	Design and implement compensators and controllers (lag, lead, PID) to optimize control system performance	K4
C134.4	Simulate and implement complete closed-loop systems with sensor-actuator dynamics, both in simulation and real-world hardware	K2
C134.5	Hands-on experience with instrumentation systems such as temperature and pressure monitoring systems, as well as real-time control applications using suitable software and hardware platforms.	K4

Course Code &Title: C135 & 23EEA02 INDUSTRIAL AUTOMATION USING PLC		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C135.1	Understand the setup, configure, and program PLC systems, troubleshoot I/O connections, manage projects, and handle fault detection and error correction in industrial automation environments.	K2
C135.2	Develop proficiency in SCADA software applications, including system configuration, graphical interface design, real-time monitoring, automation processes, hardware connectivity, and troubleshooting in industrial environments	K2



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SEMESTER VSEMESTER1

Course Code &Title: C136 & 23EE501 POWER SYSTEM ANALYSIS		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C136.1	Model the power system under steady state operating condition.	K2
C136.2	Carry out power flow analysis using iterative methods	K3
C136.3	Infer the significance of short circuit studies in designing circuit breaker	K3
C136.4	Analyze the state of the power system for various unsymmetrical faults.	K4
C136.5	Analyze the stability of power system using different methods	K4

Course Code &Title: C137 & 23EE502 POWER ELECTRONICS		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C137.1	Understand the operation of semiconductor devices and dynamic characteristics and to design & analyze the low power SMPS	K2
C137.2	Analyze the various uncontrolled rectifiers and design suitable filter circuits	K4
C137.3	Understand various PWM techniques and apply voltage control and harmonic elimination methods to inverter circuits.	K2
C137.4	Analyze the operation of the n-pulse converters and evaluate the performance parameters	K4
C137.5	Understand the operation of AC voltage controllers and its applications.	K2



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Course Code & Title: C138 & 23EE503 EMBEDDED SYSTEMS AND IOT		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C138.1	Explain the architecture and features of 8051.	K2
C138.2	Apply ARM Processor architecture and programming concepts.	K3
C138.3	Develop Arduino-based IoT applications using sensors, actuators, and communication interfaces	K3
C138.4	Use IoT communication protocols such as BLE, ZigBee, and LoRa with Raspberry Pi for device connectivity and cloud integration.	K3
C138.5	Design and evaluate real-time embedded and IoT-based solutions for smart agriculture, healthcare, smart cities, and industrial automation.	K4

Course Code & Title: C139 & 23PEE10 SPECIAL ELECTRICAL MACHINES		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C139.1	Under stand the models, power electronics systems and equipment using computational software.	K2
C139.2	Under stand the optimally design magnetic required in special machines-based drive systems using FEM based software tools	K2
C139.3	Analyze the dynamic performance of special electrical machines	K4
C139.4	Understand the operation and characteristics of special electrical machines.	K2
C139.5	Analyze the design and conduct experiments towards research.	K4



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Course Code & Title: C140 & 23PEE11 ANALYSIS ELECTRICAL MACHINES		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C140.1	Understand the modeling for a brushed DC-Motor (Shunt, Series, Compound and separately excited motor) and to simulate DC motors using state models	K2
C140.2	Apply reference frame theory for, resistive and reactive elements (three phase)	K3
C140.3	Analyze the equivalent circuit and torque of three phase induction motor and synchronous in machine variable arbitrary reference frame variable	K4
C140.4	Understand the need and advantages of multiphase machines	K2
C140.5	Compute the model of three phase and multiphase induction and synchronous machine.	K3

Course Code & Title: C141 & 23EE511 POWER SYSTEM SIMULATION LABORATORY		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C141.1	Compute the electrical parameters of transmission lines and determine sag and tension under different loading conditions also find out string efficiency in insulator.	K3
C141.2	Analyze the performance and modeling of short, medium, and long transmission lines.	K4
C141.3	Simulate and locate cable faults and performance of characteristics of typical ac/dc distribution system	K5
C141.4	Formulate and implement Y_{BUS} and Z_{BUS} matrices for network modeling and analysis.	K3
C141.5	Perform power flow studies using Gauss-Seidel and Newton-Raphson methods for steady-state analysis.	K4



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Course Code & Title: C142 & 23EE512 POWER ELECTRONICS LABORATORY		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C142.1	Analyze the performance of driver circuits for SCR/MOSFET/IGBT experimentally	K4
C142.2	Analyze the performance of the SCR commutation circuits designed for the given specifications experimentally	K4
C142.3	Analyze the performance of the designed controlled rectifiers with 'R' and 'RL' loads experimentally	K4
C142.4	Analyze the performance of the DC chopper and static circuit breakers designed for the given specifications experimentally	K4
C142.5	Analyze the performance characteristics of the given DC and AC drive by conducting suitable experiments	K4

Course Code & Title: C143 & 23EE513 INTERNSHIP I		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C143.1	Apply theoretical knowledge to solve practical problems in industrial settings	K3
C143.2	Demonstrate professional behavior, communication, and interpersonal skills in a work environment.	K3
C143.3	Analyze and document the workflow and practices of the organization	K4
C143.4	Identify the roles and responsibilities of professionals in their domain.	K2
C143.5	Reflect on their learning and propose improvements or innovations relevant to the internship experience.	K5



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SEMESTER VI

Course Code & Title: C144 & 23EE601 & Power System Protection & Switchgear		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C144.1	Analyze the different types of faults and protection schemes in power systems.	K3
C144.2	Analyze the operation of protective relays for effective power system protection.	K3
C144.3	Apply suitable protective schemes for electrical apparatus.	K3
C144.4	Apply the arc interruption schemes in Circuit Breakers.	K3
C144.5	Analyze the performance of different types of circuit breakers in electrical systems.	K3

Course Code & Title: C145 & 23PEE07 - Smart Grid		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C145.1	Explain the evolution, components, and architecture of smart and interconnected energy systems	K2
C145.2	Analyze the benefits, challenges, and global initiatives associated with smart grid implementation	K4
C145.3	Demonstrate understanding of smart grid transmission and distribution Technologies	K3
C145.4	Evaluate different smart metering and measurement systems used in modern power grids.	K5
C145.5	Apply knowledge of computing and communication technologies for efficient smart grid operation.	K3



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Course Code & Title: C146 & 23EE611 - Mini Project		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C146.1	On Completion of the mini project work students will be in a position to take up their final year project work and find solution by formulating proper methodology	K5

Course Code & Title: C147 & 23EE701 - Electric Power Utilization		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C147.1	Develop a clear idea on various illumination techniques and design lighting schemes for specific applications.	K3
C147.2	Construct electric connections for domestic appliances like refrigerators and air conditioners.	K3
C147.3	Evaluate domestic wiring connections and debug faults.	K5
C147.4	Identify suitable electric heating and welding methods for industrial applications.	K3
C147.5	Determine suitable electrical supply systems to evaluate traction and electrical drive performance.	K4



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SEMESTER VIII

Course Code & Title: C154 & 23EE811 & Project Work		
	CO Statements	Bloom's Taxonomy Level
The students should be able to		
C154.1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology..	K5