

CRITERION 3	Course Outcomes and Program Outcomes	120
-------------	---	-----

3. COURSE OUTCOMES AND PROGRAM OUTCOMES (120)

3.1. The correlation between the courses and the Program Outcomes (POs) and Program Specific Outcomes (PSOs) (20)

(Program Outcomes as mentioned in Annexure I and Program Specific Outcomes as defined by the Program)

3.1.1. Course Outcomes (COs) (SAR should include course outcomes of one course from each semester of study, however, should be prepared for all courses and made available as evidence, if asked) (05)

Course Name: Ciii Year of Study: YYYY – YY; for ex. C201 Year of study 2022-23

Course Name: - Elements of Electrical Engineering

Subject Code: - 21EME15/25, C101, Year of Study 2021-22

CO Code	NBA Code	Course Outcomes
21EE15.1	C101.1	Understand basic concepts of mechanical engineering in the fields of energy and its utilization, materials technology, manufacturing techniques, and transmission systems through demonstrations.
21EE15.2	C101.2	Understand the application of energy sources in Power generation and utilization, Engineering materials, manufacturing, and machining techniques leading to the latest advancements and transmission systems in day to day activities
21EE15.3	C101.3	Apply the skills in developing simple mechanical elements and processes

Course Name: - Basic Electrical Engineering

Subject Code: - 21EE13/23, C102, Year of Study 2021-22

CO Code	NBA Code	Course Outcomes
21EVN15.1	C102.1	Obtain the output characteristics of clipper and clamper circuits.
21EVN15.2	C102.2	Design and compare biasing circuits for transistor amplifiers & explain the transistor switching.
21EVN15.3	C102.3	Explain the concept of feedback, its types and design of feedback circuits
21EVN15.4	C102.4	Design and analyse the power amplifier circuits and oscillators for different frequencies.
21EVN15.5	C102.5	Design and analysis of FET and MOSFET amplifiers.

Course Name: - Transform Calculus, Fourier series And Numerical Techniques

Subject Code: - 21MAT31, C201, Year of Study 2022-23

CO Code	NBA Code	Course Outcomes
21MAT31.1	C201.1	To solve ordinary differential equations using Laplace transform.
21MAT31.2	C201.2	Demonstrate the Fourier series to study the behaviour of periodic functions and their communications, digital signal processing and field theory.
21MAT31.3	C201.3	To use Fourier transforms to analyze problems involving continuous-time signals and to apply Z-Transform techniques to solve difference equations
21MAT31.4	C201.4	To solve mathematical models represented by initial or boundary value problems involving partial differential equations
21MAT31.5	C201.5	Determine the extremals of functionals using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.

Course Name: Analog Electronic Circuits and Op - Amps

Subject Code: - 21EE32, C202 Year of Study 2022-23

CO Code	NBA Code	Course Outcomes
21EE32.1	C202.1	Obtain the output characteristics of clipper and clamper circuits.
21EE32.2	C202.2	Design and compare biasing circuits for transistor amplifiers & explain the transistor switching.
21EE32.3	C202.3	Explain the concept of feedback, its types and design of feedback circuits
21EE32.4	C202.4	Design and analyse the power amplifier circuits and oscillators for different frequencies.
21EE32.5	C202.5	Design and analysis of FET and MOSFET amplifiers.
21EE32.6	C202.6	Demonstrate the application of Op-amps.

Course Name: Electric Circuit Analysis

Subject Code: - 21EE33, C203 Year of Study 2022-23

CO Code	NBA Code	Course Outcomes
---------	----------	-----------------

21EE33.1	C203.1	Understand the basic concepts, basic laws and methods of analysis of DC and AC networks and reduce the complexity of network using source shifting, source transformation and network reduction using transformations.
21EE33.2	C203.2	Solve complex electric circuits using network theorems.
21EE33.3	C203.3	Discuss resonance in series and parallel circuits and also the importance of initial conditions and their evaluation.
21EE33.4	C203.4	Synthesize typical waveforms using Laplace transformation.
21EE33.5	C203.5	Solve unbalanced three phase systems and also evaluate the performance of two port networks.

Course Name: Transformers and Generators

Subject Code: - 21EE34, C204 Year of Study 2022-23

CO Code	NBA Code	Course Outcomes
21EE34.1	C204.1	Understand the construction and operation of 1-phase, 3-Phase transformers, and Autotransformer.
21EE34.2	C204.2	Analyze the performance of transformers by polarity test, Sumpner's Test, phase conversion, 3-phase connection, and parallel operation
21EE34.3	C204.3	Understand the construction and working of AC and DC Generators
21EE34.4	C204.4	Analyze the performance of the AC Generators on infinite bus and parallel operation.
21EE34.5	C204.5	Determine the regulation of AC Generator by Slip test, EMF, MMF, and ZPF Methods.

Course Name: Electrical Machines Laboratory -1

Subject Code: - 21EEL35, C205 Year of Study 2022-23

CO Code	NBA Code	Course Outcomes
21EEL35.1	C205.1	Evaluate the performance of transformers from the test data obtained.
21EEL35.2	C205.2	Connect and operate two single phase transformers of different KVA rating in parallel.
21EEL35.3	C205.3	Connect single phase transformers for three phase operation and phase conversion.

21EEL35.4	C205.4	Compute the voltage regulation of synchronous generator using the test data obtained in the laboratory.
21EEL35.5	C205.5	Evaluate the performance of synchronous generators from the test data and assess the performance of synchronous generator connected to infinite bus.

Course Name: Social Connect and Responsibility

Subject Code: - 21SCR36, C206 Year of Study 2022-23

CO Code	NBA Code	Course Outcomes
21SCR36.1	C206.1	Understand social responsibility
21SCR36.2	C206.2	Practice sustainability and creativity
21SCR36.3	C206.3	Showcase planning and organizational skills

Course Name: Samskrutika Kannada

Subject Code: - 21KSK37, C207 Year of Study 2022-23

CO Code	NBA Code	Course Outcomes
21KSK37.1	C207.1	Students will understand the Kannada language, culture, and the importance of Kannada identity and heritage.
21KSK37.2	C207.2	Students will gain knowledge about Kannada literature, folklore, and various art forms, and appreciate their cultural and aesthetic values.
21KSK37.3	C207.3	Students will gain a technical familiarity.
21KSK37.4	C207.4	Students will understand the social, cultural, and ethical values embedded in classical and modern Kannada literature.

Course Name: Balake Kannada

Subject Code: - 21KBK37, C208 Year of Study 2022-23

CO Code	NBA Code	Course Outcomes
21KBK37.1	C208.1	To understand the necessity of learning of local language for comfortable life.
21KBK37.2	C208.2	To Listen and understand the Kannada language properly.
21KBK37.3	C208.3	To speak, read and write Kannada language as per requirement.
21KBK37.4	C208.4	To communicate (converse) in Kannada language in their daily life with kannada speakers.

21KBK37.5	C208.5	To speak in polite conservation.
-----------	--------	----------------------------------

Course Name: Circuit Laboratory using Pspic

Subject Code: - 21EEL382, C209 Year of Study 2022-23

CO Code	NBA Code	Course Outcomes
21EEL382.1	C207.1	Analyse in an intelligent manner, think better, and perform better.

Course Name: Complex Analysis, Probability and Linear Programming.

Subject Code: - 21MAT41, C210 Year of Study 2022-23

CO Code	NBA Code	Course Outcomes
21MAT41.1	C210.1	Use the concepts of an analytic function and complex potentials to solve the problems arising in fluid flow.
21MAT41.2	C210.2	Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow visualization and image processing.
21MAT41.3	C210.3	Apply discrete and continuous probability distributions in analyzing the probability models arising in the engineering field.
21MAT41.4	C210.4	Analyze and solve linear programming models of real-life situations and solve LPP by the simplex method
21MAT41.5	C210.5	Learn techniques to solve Transportation and Assignment problems.

Course Name: Digital System Design

Subject Code: - 21EE42, C211 Year of Study 2022-23

CO Code	NBA Code	Course Outcomes
21EE42.1	C211.1	Develop simplified switching equation using Karnaugh Maps and QuineMcClusky techniques.
21EE42.2	C211.2	Design Multiplexer, Encoder, Decoder, Adder, Subtractors and Comparator as digital combinational control circuits.
21EE42.3	C211.3	Design flip flops, counters, shift registers as sequential control circuits.
21EE42.4	C211.4	Develop Mealy/Moore Models and state diagrams for the given clocked sequential circuit.
21EE42.5	C211.5	Explain the functioning of Read only and Read/Write Memories, Programmable ROM, EPROM and Flash memory.

21EE42.6	C211.6	Realize Boolean expressions, adders and subtractors using gates.
21EE42.7	C211.7	Design and test Ring counter/Johnson counter, Sequence generator and 3 bit counters.

Course Name: Microcontroller

Subject Code: - 21EE43, C212 Year of Study 2022-23

CO Code	NBA Code	Course Outcomes
21EE43.1	C212.1	Outline the 8051 architecture, registers, internal memory organization, addressing modes
21EE43.2	C212.2	Discuss 8051 addressing modes, instruction set of 8051, accessing data and I/O port programming.
21EE43.3	C212.3	Develop 8051C programs for time delay, I/O operations, I/O bit manipulation, logic and arithmetic operations, data conversion and timer/counter programming.
21EE43.4	C212.4	Summarize the basics of serial communication and interrupts, also develop 8051 programs for serial data communication and interrupt programming.
21EE43.5	C212.5	Program 8051 to work with external devices for ADC, DAC, Stepper motor control, DC motor control.

Course Name: Electric Motors

Subject Code: - 21EE44, C213 Year of Study 2022-23

CO Code	NBA Code	Course Outcomes
21EE44.1	C213.1	Explain the construction, operation and classification of DC Motor, AC motor and special purpose motors
21EE44.2	C213.2	Describe the performance characteristics and applications of Electric motors.
21EE44.3	C213.3	Demonstrate and explain the methods of testing of DC machines and determine losses and efficiency.
21EE44.4	C213.4	Control the speed of DC motor and induction motor.
21EE44.5	C213.5	Explain the starting methods, equivalent circuit and phasor diagrams, torque angle, effect of change in excitation and change in load, hunting and damping of synchronous motors

Course Name: Biology for Engineers

Subject Code: - 21EE45, C214 Year of Study 2022-23

CO Code	NBA Code	Course Outcomes
21EE45.1	C214.1	Elucidate the basic biological concepts via relevant industrial applications and case studies
21EE45.2	C214.2	Evaluate the principles of design and development, for exploring novel bioengineering projects
21EE45.3	C214.3	Corroborate the concepts of biomimetics for specific requirements
21EE45.4	C214.4	Think critically towards exploring innovative biobased solutions for socially relevant problems

Course Name: Electrical Machines Laboratory - 2

Subject Code: - 21EEL46, C215 Year of Study 2022-23

CO Code	NBA Code	Course Outcomes
21EEL46.1	C215.1	Test DC machines to determine their characteristics and also to control the speed of DC motor.
21EEL46.2	C215.2	Pre-determine the performance characteristics of DC machines by conducting suitable tests.
21EEL46.3	C215.3	Perform load test on single phase and three phase induction motor to assess its performance.
21EEL46.4	C215.4	Conduct test on induction motor to pre-determine the performance characteristics
21EEL46.5	C215.5	Conduct test on synchronous motor to draw the performance curves

Course Name: Constitution of India & Professional Ethics

Subject Code: 21CIP47, C216 Year of Study 2022-23

CO Code	NBA Code	Course Outcomes
21CIP47.1	C216.1	Analyse the basic structure of Indian Constitution.
21CIP47.2	C216.2	Remember their Fundamental Rights, DPSP's and Fundamental Duties(FD's) of our constitution.
21CIP47.3	C216.3	know about our Union Government, political structure & codes, procedures.
21CIP47.4	C216.4	Understand our State Executive & Elections system of India.

21CIP47.5	C216.5	Remember the Amendments and Emergency Provisions, other important provisions given by the constitution.
-----------	--------	---

Course Name Simulation of Op-Amp Circuits

Subject Code: - 21EEL484, C217 Year of Study 2022-23

CO Code	NBA Code	Course Outcomes
21EEL484.1	C217.1	Analyse in an intelligent manner, think better, and perform better.

Course Name: Universal Human Values

Subject Code: 21UH49, C218 Year of Study 2022-23

CO Code	NBA Code	Course Outcomes
21UH49.1	C218.1	By the end of the course, students are expected to become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind. They would have better critical ability. They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society). It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction. Therefore, the course and further follow up is expected to positively impact common graduate attributes like: 1. Holistic vision of life 2. Socially responsible behaviour 3. Environmentally responsible work 4. Ethical human conduct 5. Having Competence and Capabilities for Maintaining Health and Hygiene 6. Appreciation and aspiration for excellence (merit) and gratitude for all

Course Name: Inter/Intra Institutional Internship

Subject Code: 21INT49, C219 Year of Study 2022-23

CO Code	NBA Code	Course Outcomes
21INT49.1	C219.1	Use what they have learned in the class to do work in a company or institute.
21INT49.2	C219.2	Work well in a team and communicate clearly with others.
21INT49.3	C219.3	Find and solve technical problems using tools and technologies used in the industry.
21INT49.4	C219.4	Understand the importance of being responsible, ethical and aware of how engineering affects the society.
21INT49.5	C219.5	Write and present a report explaining what they did and learn during the internship

Course Name: Transmission and Distribution

Subject Code: - 21EE51, C301 Year of Study 2023-24

CO Code	NBA Code	Course Outcomes
21EE51.1	C301.1	Explain transmission and distribution scheme, identify the importance of different transmission systems and types of insulators.
21EE51.2	C301.2	Analyze and compute the parameters of the transmission line for different configurations.
21EE51.3	C301.3	Assess the performance of overhead lines.
21EE51.4	C301.4	Interpret corona, explain the use of underground cables.
21EE51.5	C301.5	Classify different types of distribution systems; examine its quality & reliability.

Course Name: Control Systems

Subject Code: - 21EE52, C302 Year of Study 2023-24

CO Code	NBA Code	Course Outcomes
21EE52.1	C302.1	Analyze and model electrical and mechanical system using analogous.
21EE52.2	C302.2	Formulate transfer functions using block diagram and signal flow graphs.
21EE52.3	C302.3	Analyze the stability of control system, ability to determine transient and steady state time response.

21EE52.4	C302.4	Illustrate the performance of a given system in time and frequency domains, stability analysis using Root locus and Bode plots.
21EE52.5	C302.5	Discuss stability analysis using Nyquist plots, Design controller and compensator for a given specification.
21EE52.6	C302.6	Utilize software package and discrete components in assessing the time and frequency domain response of a given second order system.
21EE52.7	C302.7	Design, analyze and simulate Lead, Lag and Lag – Lead compensators for given specifications.
21EE52.8	C302.8	Determine the performance characteristics of ac and DC servomotors and synchro-transmitter receiver pair used in control systems.
21EE52.9	C302.9	Simulate the DC position and feedback control system to study the effect of P, PI, PD and PID controller and Lead compensator on the step response of the system.
21EE52.10	C302.10	Develop a script files to plot Root locus, Bode plot and Nyquist plot to study the stability of a system using software package.

Course Name: Power System Analysis - 1

Subject Code: - 21EE53, C303 Year of Study 2023-24

CO Code	NBA Code	Course Outcomes
21EE53.1	C303.1	Model the power system components & construct per unit impedance diagram of power system.
21EE53.2	C303.2	Analyze three phase symmetrical faults on power system.
21EE53.3	C303.3	Compute unbalanced phasors in terms of sequence components and vice versa, also develop sequence networks.
21EE53.4	C303.4	Analyze various unsymmetrical faults on power system.
21EE53.5	C303.5	Examine dynamics of synchronous machine and determine the power system stability.

Course Name: Power Electronics

Subject Code: - 21EE54, C304 Year of Study 2023-24

CO Code	NBA Code	Course Outcomes
21EE54.1	C304.1	To give an overview of applications power electronics, different types of power semiconductor devices, their switching

		characteristics, power diode characteristics, types, their operation and the effects of power diodes on RL circuits.
21EE54.2	C304.2	To explain the techniques for design and analysis of single phase diode rectifier circuits
21EE54.3	C304.3	To explain different power transistors, their steady state and switching characteristics and limitations.
21EE54.4	C304.4	To explain different types of Thyristors, their gate characteristics and gate control requirements.
21EE54.5	C304.5	To explain the design, analysis techniques, performance parameters and characteristics of controlled rectifiers, DC- DC, DC -AC converters and Voltage controllers.

Course Name: Power Electronics Laboratory

Subject Code: - 21EEL55, C305 Year of Study 2023-24

CO Code	NBA Code	Course Outcomes
21EEL55.1	C305.1	Obtain static characteristics of semiconductor devices to discuss their performance.
21EEL55.2	C305.2	Trigger the SCR by different methods
21EEL55.3	C305.3	Verify the performance of single phase controlled full wave rectifier and AC voltage controller with R and RL loads.
21EEL55.4	C305.4	Control the speed of a DC motor, universal motor and stepper motors.
21EEL55.5	C305.5	Verify the performance of single phase full bridge inverter connected to resistive load.

Course Name: Research Methodology & Intellectual Property Rights

Subject Code: - 21RMI56, C306 Year of Study 2023-24

CO Code	NBA Code	Course Outcomes
21RMI56.1	C306.1	To know the meaning of engineering research
21RMI56.2	C306.2	To know the procedure of Literature Review and Technical Reading
21RMI56.3	C306.3	To Know the fundamentals of patent law and drafting procedure.
21RMI56.4	C306.4	Understanding the copyright laws and subject matters of copyrights and designs
21RMI56.5	C306.5	Understand the basic principle of Design rights.

Course Name: Environmental Studies

Subject Code: - 21CIV57, C307 Year of Study 2023-24

CO Code	NBA Code	Course Outcomes
21CIV57.1	C307.1	Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale
21CIV57.2	C307.2	Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment
21CIV57.3	C307.3	Demonstrate ecology knowledge of a complex relationship between biotic and a biotic components.
21CIV57.4	C307.4	Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues

Course Name: Renewable Energy Projects

Subject Code: - 21EEP584, C308 Year of Study 2023-24

CO Code	NBA Code	Course Outcomes
21EEP584.1	C308.1	Analyse in a systematic way, think better, and perform better

Course Name: Management and Entrepreneurship

Subject Code: - 21EE61, C309 Year of Study 2023-24

CO Code	NBA Code	Course Outcomes
21EE61.1	C309.1	Explain the field of management, task of the manager, planning and steps in decision making.
21EE61.2	C309.2	Discuss the structure of organization, importance of staffing, leadership styles, modes of communication, techniques of coordination and importance of managerial control in business.

21EE61.3	C309.3	Explain the concepts of entrepreneurship and a businessman's social responsibilities towards different groups.
21EE61.4	C309.4	Show an understanding of role of SSI's in the development of country and state/central level institutions/ agencies supporting business enterprises.
21EE61.5	C309.5	Discuss the concepts of project management, capital budgeting, project feasibility studies, need for project report and new control techniques.

Course Name: Power System Analysis - 2

Subject Code: - 21EE62, C310 Year of Study 2023-24

CO Code	NBA Code	Course Outcomes
21EE62.1	C310.1	Formulate network matrices and models for solving load flow problems.
21EE62.2	C310.2	Perform steady state power flow analysis of power systems using numerical iterative techniques.
21EE62.3	C310.3	Solve issues of economic load dispatch and unit commitment problems.
21EE62.4	C310.4	Analyze short circuit faults in power system networks using bus impedance matrix.
21EE62.5	C310.5	Apply Point by Point method and Runge Kutta Method to solve Swing Equation.
21EE62.6	C310.6	Develop a program in suitable package to assess the performance of medium and long transmission lines
21EE62.7	C310.7	Develop a program in suitable package to obtain the power angle characteristics of salient and non-salient pole alternator.
21EE62.8	C310.8	Develop a program in suitable package to assess the transient stability under three phase fault at different locations in a of radial power systems.
21EE62.9	C310.9	Develop programs in suitable package to formulate bus admittance and bus impedance matrices of interconnected power systems.
21EE62.10	C310.10	Use suitable package to solve power flow problem for simple power systems
21EE62.11	C310.11	Use suitable package to study unsymmetrical faults at different locations in radial power systems
21EE62.12	C310.12	Use of suitable package to study optimal generation scheduling problems for thermal power plants.

Course Name: Signals and Digital Signal Processing

Subject Code: - 21EE63, C311 Year of Study 2023-24

CO Code	NBA Code	Course Outcomes
21EE63.1	C311.1	Discuss classification and basic operations that can be performed on both continuous and discrete time signals
21EE63.2	C311.2	Evaluate Discrete Fourier Transform of a sequence and the convolution of two sequences to determine the output sequence.
21EE63.3	C311.3	Evaluate Discrete Fourier Transform of a sequence by using fast methods.
21EE63.4	C311.4	Design Butterworth and Chebyshev IIR digital filters and FIR filters using different techniques.
21EE63.5	C311.5	Develop different structures for IIR and FIR filters.

Course Name: Electrical Engineering Materials

Subject Code: - 21EE644, C312 Year of Study 2023-24

CO Code	NBA Code	Course Outcomes
21EE644.1	C312.1	Discuss electrical and electronics materials, their importance, classification, and operational requirements.
21EE644.2	C312.2	Discuss conducting, dielectric, insulating, and magnetic materials used in engineering, their properties and classification.
21EE644.3	C312.3	Explain the phenomenon superconductivity, super conducting materials and their application in engineering.
21EE644.4	C312.4	Explain the plastic and its properties and applications.

Course Name: Renewable Energy Power Plant

Subject Code: - 21EE652, C313 Year of Study 2023-24

CO Code	NBA Code	Course Outcomes
21EE652.1	C313.1	Discuss causes of energy scarcity and its solution, energy resources and availability of renewable energy.
21EE652.2	C313.2	Outline energy from sun, energy reaching the Earth's surface and solar thermal energy applications.
21EE652.3	C313.3	Discuss types of solar collectors, their configurations, solar cell system, its characteristics and their applications.
21EE652.4	C313.4	Explain generation of energy from hydrogen, wind, geothermal system, solid waste and agriculture refuse.
21EE652.5	C313.5	Discuss production of energy from biomass, biogas.

21EE652.6	C313.6	Summarize tidal energy resources, sea wave energy and ocean thermal energy.
-----------	--------	---

Course Name: Digital Signal Processing Laboratory

Subject Code: - 21EEL66, C314 Year of Study 2023-24

CO Code	NBA Code	Course Outcomes
21EEL66.1	C314.1	Conduct sampling of signals in time and frequency domains.
21EEL66.2	C314.2	Evaluate the impulse response of a system
21EEL66.3	C314.3	Obtain convolution of given sequences to evaluate the response of a system.
21EEL66.4	C314.4	Compute DFT and IDFT of a given sequence using the basic definition and/or fast methods.
21EEL66.5	C314.5	Provide a solution for a given difference equation.
21EEL66.6	C314.6	Design and implement IIR and FIR filters

Course Name: Mini Project

Subject Code: - 21EEMP67, C315 Year of Study 2023-24

CO Code	NBA Code	Course Outcomes
21EEMP67.1	C315.1	Identify and define a practical engineering problem based on theoretical knowledge from core subjects.
21EEMP67.2	C315.2	Develop preliminary designs, models, or simulations to propose solutions for the identified problem.
21EEMP67.3	C315.3	Work collaboratively or individually to implement and test the proposed solution.
21EEMP67.3	C315.4	Analyze and interpret results to evaluate the effectiveness of the solution.
21EEMP67.4	C315.5	Communicate technical information effectively through project reports and presentations.

Course Name: -Innovation/Entrepreneurship/Societal Internship

Subject Code: - 21INT68, C316 Year of Study 2023-24

CO Code	NBA Code	Course Outcomes
21INT68.1	C316.1	Understand the basic concepts of innovation, entrepreneurship, and societal development through practical exposure.
21INT68.2	C316.2	Develop an entrepreneurial mindset and identify opportunities for innovation in various sectors.

21INT68.3	C316.3	Gain hands-on experience in societal projects, understanding social challenges and sustainable solutions.
21INT68.4	C316.4	Build skills in project planning, execution, and management in the context of entrepreneurship and societal impact.
21INT68.5	C316.5	Demonstrate effective communication, teamwork, and ethical behavior while engaging with communities and stakeholders.

Course Name: High Voltage and Power System Protection

Subject Code: - 21EE71, C401 Year of Study 2024-25

CO Code	NBA Code	Course Outcomes
21EE71.1	C401.1	Apply the knowledge of dielectric property for insulation, it's performances as per Standards and High voltage application in power system Equipment's.
21EE71.2	C401.2	Analyze the circuits of high voltages, high currents in Generation and Measurements.
21EE71.3	C401.3	Apply relays to the power system protection.
21EE71.4	C401.4	Discuss the construction, operating principles and performances of circuit breaker.
21EE71.5	C401.5	Discuss protection of generators, motors, Transformer and Bus Zone Protection.
21EE71.6	C401.6	Describe the causes of over voltages and their remedial measures.
21EE71.7	C401.7	Analyze the spark over characteristics using High voltages for checking the breakdown phenomenon and dielectric strength of dielectric materials.
21EE71.8	C401.8	Experimentally verify the characteristics of over current, over voltage, under voltage using electromagnetic, static, distance and impedance relays
21EE71.9	C401.9	Demonstration of protective schemes for motor and feeders

Course Name: Power System Operation and Control

Subject Code: - 21EE72, C402 Year of Study 2024-25

CO Code	NBA Code	Course Outcomes
21EE72.1	C402.1	Describe various levels of controls in power systems, architecture and configuration of SCADA.
21EE72.2	C402.2	To explain components, architecture and configuration of SCADA.
21EE72.3	C402.3	To explain basic generator control loops, functions of Automatic generation control, speed governors and mathematical models of Automatic Load Frequency Control
21EE72.4	C402.4	To explain automatic generation control, voltage and reactive power control in an interconnected power system
21EE72.5	C402.5	To explain reliability and contingency analysis, state estimation and related issues.

Course Name: Power System Planning

Subject Code: - 21EE731, C403 Year of Study 2024-25

CO Code	NBA Code	Course Outcomes
21EE731.1	C403.1	Discuss primary components of power system planning, planning methodology for optimum power system expansion and load forecasting.
21EE731.2	C403.2	Understand economic appraisal to allocate the resources efficiently and appreciate the investment decisions
21EE731.3	C403.3	Discuss expansion of power generation and planning for system energy in the country, evaluation of operating states of transmission system, their associated contingencies and the stability of the system.
21EE731.4	C403.4	Discuss principles of distribution planning, supply rules, network development and the system studies
21EE731.5	C403.5	Discuss reliability criteria for generation, transmission, distribution and reliability evaluation and analysis, grid reliability, voltage disturbances and their remedies
21EE731.6	C403.6	Discuss planning and implementation of electric –utility activities, market principles and the norms framed.

Course Name: Industrial Drives and Applications

Subject Code: - 21EE744, C404 Year of Study 2024-25

CO Code	NBA Code	Course Outcomes
---------	----------	-----------------

21EE744.1	C404.1	Explain the advantages, choice and control of electric drive
21EE744.2	C404.2	Explain the dynamics, generating and motoring modes of operation of electric drives
21EE744.3	C404.3	Explain the selection of motor power rating to suit industry requirements
21EE744.4	C404.4	Analyze the performance & control of DC motor drives using controlled rectifiers
21EE744.5	C404.5	Analyze the performance & control of converter fed Induction motor, synchronous motor & stepper motor drives.

Course Name: NON-TRADITIONAL MACHINING

Subject Code: - 21ME751, C405 Year of Study 2024-25

CO Code	NBA Code	Course Outcomes
21ME751.1	C405.1	Understand the compare traditional and non-traditional machining process and recognize the need for Non-traditional machining process.
21ME751.2	C405.2	Understand the constructional features, performance parameters, process characteristics, applications, advantages and limitations of USM, AJM and WJM.
21ME751.3	C405.3	Identify the need of Chemical and electro-chemical machining process along with the constructional features of the equipment, process parameters, process characteristics, applications, advantages and limitations.
21ME751.4	C405.4	Understand the constructional feature of the equipment, process parameters, process characteristics, applications, advantages and limitations EDM & PAM.
21ME751.5	C405.5	Understand the LBM equipment, LBM parameters, and characteristics. EBM equipment and mechanism of metal removal, applications, advantages and limitations LBM & EBM.

Course Name: Project work

Subject Code: - 21EEP76, C406 Year of Study 2024-25

CO Code	NBA Code	Course Outcomes
21EEP76.1	C406.1	Identify, analyze, and formulate engineering problems based on the knowledge acquired in core and elective subjects.
21EEP76.2	C406.2	Apply research methodology, design thinking, and engineering principles to develop innovative solutions and prototype models.

21EEP76.3	C406.3	Work effectively as an individual or in a team to plan, design, implement, and test an engineering project.
21EEP76.4	C406.4	Communicate technical ideas and project results effectively through written reports and oral presentations.
21EEP76.5	C406.5	Demonstrate professional ethics, lifelong learning, and an awareness of societal and environmental responsibilities in engineering practice.

Course Name: Technical Seminar

Subject Code: - 21EE81, C407 Year of Study 2024-25

CO Code	NBA Code	Course Outcomes
21EE81.1	C407.1	Identify and explore current topics of technical importance through literature survey and research.
21EE81.2	C407.2	Develop skills in organizing and presenting technical information effectively using appropriate communication tools.
21EE81.3	C407.3	Demonstrate ability to critically analyze technical literature and synthesize relevant information.
21EE81.4	C407.4	Exhibit professional communication skills through technical report writing and oral presentations.
21EE81.5	C407.5	Foster independent learning, teamwork, and ethical responsibilities in the dissemination of technical knowledge.

Course Name: Industrial Internship

Subject Code: - 21INT822, C408 Year of Study 2024-25

CO Code	NBA Code	Course Outcomes
21INT822.1	C408.1	Apply theoretical knowledge and technical skills gained in the academic curriculum to real-world industrial environments.
21INT822.2	C408.2	Gain practical experience in using tools, equipment, and technologies relevant to the chosen engineering discipline.
21INT822.3	C408.3	Develop problem-solving skills and adapt to workplace challenges in an industrial or research setting.
21INT822.4	C408.4	Enhance professional communication, teamwork, and interpersonal skills in a work environment.
21INT822.5	C408.5	Prepare and present a detailed internship report demonstrating learnings, contributions, and reflections on the industrial experience.

3.1.2. CO-PO matrices of courses selected in 3.1.1(six matrices mentioned; one per semester from 3rd to 8th semester) (05)

Course Name: - Transform Calculus, Fourier series And Numerical Techniques

Subject Code: - 21MAT31, C201, Year of Study 2022-23

CO – PO MAPPING													
CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21MAT31.1	C201.1	3	3	2									
21MAT31.2	C201.2	3	3	2									
21MAT31.3	C201.3	3	3	2									
21MAT31.4	C201.4	3	3	2									
21MAT31.5	C201.5	3	3	2									
21MAT31	C201	3	3	2									

Course Name: Analog Electronic Circuits and Op - Amps

Subject Code: - 21EE32, C202 Year of Study 2022-23

CO – PO MAPPING													
CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EE32.1	C202.1	3	2	1	-	-							
21EE32.2	C202.2	3	2	3	-	2							
21EE32.3	C202.3	3	2	2	-	2							
21EE32.4	C202.4	3	2	3	-	2							
21EE32.5	C202.5	3	2	3	-	2							
21EE32.6	C202.6	3	2	2	-	3							
21EE32	C202	3	2	2.33	-	2.2							

Course Name: Electric Circuit Analysis

Subject Code: - 21EE33, C203 Year of Study 2022-23

CO – PO MAPPING													
CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EE33.1	C203.1	3	2	2	-	-							

NBA SAK CRITERIA													
21EE33.2	C203.2	3	3	2	-	-							
21EE33.3	C203.3	3	2	2	-	-							
21EE33.4	C203.4	3	2	2	2	2							
21EE33.5	C203.5	3	2	2	2	2							
21EE33	C203	3	2.2	2	2	2							

Course Name: Transformers and Generators

Subject Code: - 21EE34, C204 Year of Study 2022-23

CO – PO MAPPING

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EE34.1	C204.1	3	2	1	–	–							
21EE34.2	C204.2	3	3	2	–	2							
21EE34.3	C204.3	3	2	1	–	–							
21EE34.4	C204.4	3	3	2	–	2							
21EE34.5	C204.5	3	3	2	–	2							
21EE34	C204	3	2.6	1.6	–	2							

Course Name: Electrical Machines Laboratory -1

Subject Code: - 21EEL35, C205 Year of Study 2022-23

CO – PO MAPPING

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EEL35.1	C205.1	3	2	2	–	2							
21EEL35.2	C205.2	3	2	3	–	2							
21EEL35.3	C205.3	3	2	3	–	2							
21EEL35.4	C205.4	3	3	2	–	2							
21EEL35.5	C205.5	3	3	2	–	2							
21EEL35	C205	3	2.4	2.4		2							

Course Name: Social Connect and Responsibility

Subject Code: - 21SCR36, C206 Year of Study 2022-23

CO – PO MAPPING

NBA SAR CRITERIA 3

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21SCR36.1	C206.1						3	3	3	3	3		3
21SCR36.2	C206.2						3	3	3	3	3		3
21SCR36.3	C206.3						3	3	3	3	3		3
21SCR36	C206						3	3	3	3	3		3

Course Name: - Samskrutika Kannada

Subject Code: - 21KSK37, C207 Year of Study 2022-23

CO PO Mapping

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21KSK37.1	C207.1									2	3		3
21KSK37.2	C207.2									2	3		3
21KSK37.3	C207.3									2	3		3
21KSK37.4	C207.4									2	3		3
21KSK37	C207									2	3		3

Course Name: - Balake Kannada (Kannada for administration)

Subject Code: -21KBK37, C208 Year of Study 2022-23

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21KBK37.1	C208.1									2	3		3
21KBK37.2	C208.2									2	3		3
21KBK37.3	C208.3									2	3		3
21KBK37.4	C208.4									2	3		3
21KBK37	C208.5									2	3		3
21KBK37	C208									2	3		3

Course Name: Circuit Laboratory using Pspic

Subject Code: - 21EEL382, C209 Year of Study 2022-23

CO PO Mapping

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
---------	----------	-----	-----	-----	-----	-----	-----	-----	-----	-----	------	------	------

NBA SAK CRITERIA'S												
21EE381.1	C209.1	3	3	3		3						
21EE381	C209	3	3	3		3						

Course Name: Complex Analysis, Probability and Linear Programming.

Subject Code: - 21MATME41, C210 Year of Study 2022-23

CO PO Mapping

[illegible]

Course Name: Digital System Design

Subject Code: - 21EE42, C211 Year of Study 2022-23

CO – PO MAPPING

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EE42.1	C211.1	3	3	2	–	–							
21EE42.2	C211.2	3	2	3	–	2							
21EE42.3	C211.3	3	2	3	–	2							
21EE42.4	C211.4	3	3	3	–	2							
21EE42.5	C211.5	3	2	2	–	2							
21EE42.6	C211.6	3	2	2	–	–							
21EE42.7	C211.7	3	2	3	2	2							
21EE42	C211	3	2.28	2.57	2	2							

Course Name: Microcontroller

Subject Code: - 21EE43, C212 Year of Study 2022-23

CO – PO MAPPING

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EE43.1	C212.1	3	2	1	–	3							
21EE43.2	C212.2	3	3	2	–	3							
21EE43.3	C212.3	3	3	3	–	2							
21EE43.4	C212.4	3	3	3	–	2							
21EE43.5	C212.5	3	3	3	2	2							
21EE43	C212	3	2.8	2.4	2	2.4							

Course Name: Electric Motors

Subject Code: - 21EE44, C213 Year of Study 2022-23

CO – PO Mapping													
CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EE44.1	C213.1	3	2	–	–	–							
21EE44.2	C213.2	3	3	–	–	–							
21EE44.3	C213.3	3	2	–	2	2							
21EE44.4	C213.4	3	3	2	–	2							
21EE44.5	C213.5	3	2	–	–	–							
21EE44	C213	3	2.4	2	2	2							

Course Name: Biology for Engineers

Subject Code: - 21EE45, C214 Year of Study 2022-23

[illegible]

Course Name: Electrical Machines Laboratory - 2

Subject Code: - 21EEL46, C215 Year of Study 2022-23

CO – PO MAPPING	
------------------------	--

NBA SAK CRITERIA'S													
CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EEL46.1	C215.1	3	3	1	3					3	3		
21EEL46.2	C215.2	3	3	1	3					3	3		
21EEL46.3	C215.3	3	3	1	3					3	3		
21EEL46.4	C215.4	3	3	1	3					3	3		
21EEL46.5	C215.5	3	3	1	3					3	3		
21EEL46	C215	3	3	1	3					3	3		

Course Name: Constitution of India and Professional Ethics

Subject Code: - 21CIP47, C216 Year of Study 2022-23

CO PO Mapping													
CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21CIP37.1	C216.1						3		3	2	3		3
21CIP37.2	C216.2						3		3	2	3		3
21CIP37.3	C216.3						3		3	2	3		3
21CIP37.4	C216.4						3		3	2	3		3
21CIP37.5	C216.5						3		3	2	3		3
21CIP37	C217						3		3	2	3		3

Course Name Simulation of Op-Amp Circuits

Subject Code: - 21EEL484, C217 Year of Study 2022-23

CO PO Mapping													
CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EEL484.1	C217.1	3	3	3		3							
21EEL484	C217	3	3	3		3							

Course Name: Universal Human Values/ UNDERSTANDING HARMONY and ETHICAL HUMAN CONDUCT

Subject Code: - 21UHV49, C218 Year of Study 2022-23

CO PO Mapping													
CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

21UHV49.1	C218.1						3		3	2			3
21UHV49	C218						3		3	2			3

Course Name: Inter/Intra Institutional Internship

Subject Code: - 21INT49, C219 Year of Study 2022-23

CO – PO MAPPING

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21INT49.1	C219.1	2	1	1	2		2			2	2		1
21INT49.2	C219.2	2	1	1	2		2			2	2		1
21INT49.3	C219.3	2	1	1	2		2			2	2		1
21INT49.4	C219.4	2	1	1	2		2			2	2		1
21INT49.5	C219.5	2	1	1	2		2			2	2		1
21INT49	C219	2	1	1	2		2			2	2		1

Course Name: Transmission and Distribution

Subject Code: - 21EE51, C301 Year of Study 2023-24

CO – PO MAPPING

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EE51.1	C301.1	3	2										1
21EE51.2	C301.2	3	3	2									1
21EE51.3	C301.3	3	3										1
21EE51.4	C301.4	3	2				2	1					1
21EE51.5	C301.5	3	2	2									1
21EE51	C301	3	2.4	2			2	1					1

Course Name: Control Systems

Subject Code: - 21EE52, C302 Year of Study 2023-24

CO – PO MAPPING

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EE52.1	C302. 1	3	3	2	–	–				–	–		–
21EE52.2	C302.2	3	3	2	–	–				–	–		–
21EE52.3	C302.3	3	3	2	2	–				–	–		–

21EE52.4	C302.4	3	3	3	2	2				–	–		–
21EE52.5	C302.5	3	3	3	2	2				–	–		–
21EE52.6	C302.6	3	2	3	3	3				1	1		2
21EE52.7	C302.7	3	3	3	2	3				1	1		–
21EE52.8	C302.8	3	2	2	2	2				–	–		–
21EE52.9	C302.9	3	3	3	2	3				1	1		2
21EE52.10	C302.10	3	3	2	2	3				1	1		2
21EE52	C302	3	2.8	2.5	2.15	2.57				1	1		2

Course Name: Power System Analysis - 1

Subject Code: - 21EE53, C303 Year of Study 2023-24

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EE53.1	C303.1	3	3	2	–	3							
21EE53.2	C303.2	3	3	2	–	3							
21EE53.3	C303.3	3	3	2	–	3							
21EE53.4	C303.4	3	3	2	–	3							
21EE53.5	C303.5	3	3	2	2	3							
21EE53	C303	3	3	2	2								

Course Name: Power Electronics

Subject Code: - 21EE54, C304 Year of Study 2023-24

CO PO Mapping													
CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EE54.1	C304.1	3	2	–	–								
21EE54.2	C304.2	3	3	2	–								
21EE54.3	C304.3	3	2	–	–								
21EE54.4	C304.4	3	2	–	–								
21EE54.5	C304.5	3	3	2	2								
21EE54	C304	3	2.4	2	2								

Course Name: Power Electronics Laboratory

Subject Code: - 21EEL55, C305 Year of Study 2023-24

CO – PO MAPPING

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EEL55.1	C305.1	3	3	–	2	2				1	1		
21EEL55.2	C305.2	3	3	2	2	2				1	1		
21EEL55.3	C305.3	3	3	3	2	2				1	1		
21EEL55.4	C305.4	3	3	3	2	2				1	1		
21EEL55.5	C305.5	3	3	3	2	2				1	1		
21EEL55	C305	3	3	2.75	2	2				1	1		

Course Name: Research Methodology & Intellectual Property Rights

Subject Code: - 21RMI56, C306 Year of Study 2023-24

CO – PO MAPPING

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21RMI56.1	C306.1						3		3	2	3		3
21RMI56.2	C306.2						3		3	2	3		3
21RMI56.3	C306.3						3		3	2	3		3
21RMI56.4	C306.4						3		3	2	3		3
21RMI56.5	C306.5						3		3	2	3		3
21RMI56	C306						3		3	2	3		3

Course Name: Environmental Studies

Subject Code: - 21CIV57, C307 Year of Study 2023-24

CO – PO MAPPING

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21CIV57.1	C307.1						3	3					3
21CIV57.2	C307.2						3	3					3
21CIV57.3	C307.3						3	3					3
21CIV57.4	C307.4						3	3					3
21CIV57	C307						3	3					3

Course Name: Renewable Energy Projects

Subject Code: - 21EEP584, C308 Year of Study 2023-24

CO – PO MAPPING

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EEP584.1	C308.1	3	3	3		3							
21EE582	C308	3	3	3		3							

Course Name: Management and Entrepreneurship

Subject Code: - 21EE61, C309 Year of Study 2023-24

CO – PO MAPPING

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EE61.1	C309.1						–	–	–	–	2	–	2
21EE61.2	C309.2						–	–	–	3	3	–	2
21EE61.3	C309.3						3	–	3	2	2	–	–
21EE61.4	C309.4						2	2	–	–	–	2	2
21EE61.5	C309.5						–	–	–	–	–	3	2
21EE61	C309						2.5	2	3	2.5	2.33	2.5	2

Course Name: Power System Analysis - 2

Subject Code: - 21EE62, C310 Year of Study 2023-24

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EE62.1	C310.1	3	3	–	–	–						–	–
21EE62.2	C310.2	3	3	–	–	2						–	–
21EE62.3	C310.3	3	3	2	–	2						–	–
21EE62.4	C310.4	3	3	–	–	2						–	–
21EE62.5	C310.5	3	3	2	3	2						–	–
21EE62.6	C310.6	3	2	2	3	3						–	2
21EE62.7	C310.7	3	2	2	2	3						–	2
21EE62.8	C310.8	3	3	2	3	3						–	2
21EE62.9	C310.9	3	3	2	2	3						–	–
21EE62.10	C310.10	3	3	–	2	3						–	–
21EE62.11	C310.11	3	3	–	2	3						–	–

21EE62.12	C310.12	3	3	2	2	3						3	2
21EE62	C310	3	2.83	2	2.37	2.63						3	2

Course Name: Signals and Digital Signal Processing

Subject Code: - 21EE63, C311 Year of Study 2023-24

CO – PO MAPPING													
CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EE63.1	C311.1	3	2	–	–	1	3						
21EE63.2	C311.2	3	3	2	–	1	3						
21EE63.3	C311.3	3	3	2	–	2	3						
21EE63.4	C311.4	3	3	3	–	2	3						
21EE63.5	C311.5	3	2	3	–	2	3						
21EE63	C311	3	2.6	2.5	–	1.6	3						

Course Name: Electrical Engineering Materials

Subject Code: - 21EE644, C312 Year of Study 2023-24

CO – PO MAPPING													
CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EE644.1	C312.1	3	2										
21EE644.2	C312.2	3	2										
21EE644.3	C312.3	3	2										2
21EE644.4	C312.4	3	–										2
21EE644	C312	3	2										2

Course Name: Renewable Energy Power Plant

Subject Code: - 21EE652, C313 Year of Study 2023-24

CO – PO MAPPING													
CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EE652.1	C313.1	3	3				2	2					
21EE652.2	C313.2	3	3				2	2					
21EE652.3	C313.3	3	3				2	2					
21EE652.4	C313.4	3	3				2	2					

NBA SAR CRITERIA 3

21EE652.5	C313.5	3	3				2	2					
21EE652.6	C313.6	3	3				2	2					
21EE652	C313	3	3				2	2					

Course Name: Digital Signal Processing Laboratory

Subject Code: - 21EEL66, C314 Year of Study 2023-24

CO – PO MAPPING

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EEL66.1	C314.1	2	2	–	–	2				1	1		
21EEL66.2	C314.2	3	2	–	2	2				1	1		
21EEL66.3	C314.3	3	3	–	2	2				1	1		
21EEL66.4	C314.4	3	3	2	2	3				1	1		
21EEL66.5	C314.5	3	3	2	2	3				1	1		
21EEL66.6	C314.6	3	3	1	2	3				1	1		
21EEL66	C314	2.83	2.66	1.66	2	2.5				1	1		

Course Name: Mini Project

Subject Code: - 21EEMP67, C315 Year of Study 2023-24

CO – PO MAPPING

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EEMP67.1	C315.1	3	2	3	1	1	-	1	-	-	1	-	2
21EEMP67.2	C315.2	2	3	3	2	2	-	1	-	-	1	-	2
21EEMP67.3	C315.3	2	2	3	2	2	-	1	1	3	2	1	2
21EEMP67.4	C315.4	2	2	3	3	2	-	1	1	2	2	-	2
21EEMP67.5	C315.5	1	1	2	1	2	-	1	2	3	3	2	2
21EEMP67	C315	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5

Course Name: -Innovation/Entrepreneurship/Societal Internship

Subject Code: - 21INT68, C316 Year of Study 2023-24

CO – PO MAPPING

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
---------	----------	-----	-----	-----	-----	-----	-----	-----	-----	-----	------	------	------

21INT68.1	C316.1	1	-	1	-	-	2	2	-	-	1	-	1
21INT68.2	C316.2	-	1	2	-	1	-	2	-	-	1	1	2
21INT68.3	C316.3	1	1	2	1	1	2	3	1	1	1	-	2
21INT68.4	C316.4	-	-	2	1	2	-	2	-	2	2	1	2
21INT68.5	C316.5	-	-	-	-	1	-	1	2	3	3	2	1
21INT68	C316	1	1	1	1	1	1	1	1	1	1	1	1

Course Name: High Voltage and Power System Protection

Subject Code: - 21EE71, C401 Year of Study 2024-25

CO – PO MAPPING

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EE71.1	C401.1	3	2	–	–	2				–	–		2
21EE71.2	C401.2	3	3	–	2	3				–	–		–
21EE71.3	C401.3	3	2	2	–	2				–	–		–
21EE71.4	C401.4	3	2	–	–	2				–	–		–
21EE71.5	C401.5	3	2	2	–	2				–	–		–
21EE71.6	C401.6	3	2	–	–	–				–	–		2
21EE71.7	C401.7	3	3	–	3	3				–	–		–
21EE71.8	C401.8	3	3	3	2	3				2	2		–
21EE71.9	C401.9	3	2	3	2	3				2	2		–
21EE71	C401	3	2.33	2.5	2.25	2.5				2	2		2

Course Name: Power System Operation and Control

Subject Code: - 21EE72, C402 Year of Study 2024-25

CO – PO MAPPING

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EE72.1	C402.1	3	2	–	–	2							2
21EE72.2	C402.2	3	3	2	2	2							–
21EE72.3	C402.3	3	3	2	2	2							–
21EE72.4	C402.4	3	2	2	2	2							–
21EE72.5	C402.5	3	3	2	2	2							2

21EE72	C402	3	2.6	2	2	2						2
---------------	-------------	----------	------------	----------	----------	----------	--	--	--	--	--	----------

Course Name: Power System Planning

Subject Code: - 21EE731, C403 Year of Study 2024-25

CO – PO MAPPING

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EE731.1	C403.1	3	2	–	2	2	–	–					2
21EE731.2	C403.2	3	3	–	–	–	2	2					2
21EE731.3	C403.3	3	3	2	2	2	–	–					–
21EE731.4	C403.4	3	2	–	2	2	–	–					–
21EE731.5	C403.5	3	3	–	2	2	–	–					2
21EE731.6	C403.6	3	2	–	–	–	2	2					2
21EE731	C403	3	2.5	2	2	2	2	2					2

Course Name: Industrial Drives and Applications

Subject Code: 21EE744, C404 Year of Study 2024-25

CO – PO MAPPING

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EE744.1	C404.1	3	3	1									
21EE744.2	C404.2	3	3	1									
21EE744.3	C404.3	3	3	3	3		3	3					
21EE744.4	C404.4	3	3	1			3	3					
21EE744	C404	3	3	1.5	0.75		1.5	1.5					

Course Name: Non Traditional Maching

Subject Code: - 21ME751, C405 Year of Study 2024-25

CO – PO MAPPING

[illegible]

[illegible]

Course Name: Project work

Subject Code: - 21EEP76, C406 Year of Study 2024-25

CO – PO MAPPING

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EEP76.1	C406.1	3	3	3	3	2	2	3	3	3	3	3	3
21EEP76.2	C406.2	3	3	3	3	2	2	3	3	3	3	3	3
21EEP76.3	C406.3	3	3	3	3	2	2	3	3	3	3	3	3
21EEP76.4	C406.4	3	3	3	3	2	2	3	3	3	3	3	3
21EEP76.5	C406.5	3	3	3	3	2	2	3	3	3	3	3	3
21EEP76	C406	3	3	3	3	2	2	3	3	3	3	3	3

Course Name: Technical Seminar

Subject Code: - 21EE81, C407 Year of Study 2024-

CO – PO MAPPING

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EE81.1	C407.1	3	3	3					1	3	3		
21EE81.2	C407.2	3	3	3					1	3	3		
21EE81.3	C407.3	3	3	3					1	3	3		
21EE81.4	C407.4	3	3	3					1	3	3		
21EE81.5	C407.5	3	3	3					1	3	3		
21EE81	C407	3	3	3					1	3	3		

Course Name: Industrial Internship

Subject Code: - 21INT82, C408 Year of Study 2024-25

CO – PO MAPPING

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
---------	----------	-----	-----	-----	-----	-----	-----	-----	-----	-----	------	------	------

21INT82.1	C408.1		2	2	3	1	3		1	2	3	2	
21INT82.2	C408.2		2	2	3	1	3		1	2	3	2	
21INT82.3	C408.3		2	2	3	1	3		1	2	3	2	
21INT82.4	C408.4		2	2	3	1	3		1	2	3	2	
21INT82.5	C408.5		2	2	3	1	3		1	2	3	2	
21INT82	C408		2	2	3	1	3		1	2	3	2	

3.1.2. CO-PSO matrices of courses selected in 3.1.1(six matrices mentioned; one per semester from 3rd to 8th semester) (05)

Course Name: - Transform Calculus, Fourier series And Numerical Techniques

Subject Code: - 21MAT31, C201, Year of Study 2022-23

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21MAT31.1	C201.1	3	2	–
21MAT31.2	C201.2	3	3	–
21MAT31.3	C201.3	3	3	–
21MAT31.4	C201.4	3	3	–
21MAT31.5	C201.5	2	3	–
21MAT31	C201	3	2	–

Course Name: Analog Electronic Circuits and Op - Amps

Subject Code: - 21EE32, C202 Year of Study 2022-23

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EE32.1	C202.1	3	2	0
21EE32.2	C202.2	3	3	0

21EE32.3	C202.3	3	3	0
21EE32.4	C202.4	3	3	0
21EE32.5	C202.5	3	3	0
21EE32.6	C202.6	3	3	0
21EE32	C202	3	2.83	0

Course Name: Electric Circuit Analysis

Subject Code: - 21EE33, C203 Year of Study 2022-23

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EE33.1	C203.1	3	2	0
21EE33.2	C203.2	3	2	0
21EE33.3	C203.3	3	2	0
21EE33.4	C203.4	3	2	0
21EE33.5	C203.5	3	2	0
21EE33	C203	3	2	

Course Name: Transformers and Generators

Subject Code: - 21EE34, C204 Year of Study 2022-23

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EE34.1	C204.1	3	2	0
21EE34.2	C204.2	3	2	0
21EE34.3	C204.3	3	2	0
21EE34.4	C204.4	3	2	0
21EE34.5	C204.5	3	2	0
21EE34	C204	3	2	

Course Name: Electrical Machines Laboratory -1

Subject Code: - 21EEL35, C205 Year of Study 2022-23

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EEL35.1	C205.1	3	2	0
21EEL35.2	C205.2	3	2	2
21EEL35.3	C205.3	3	2	0
21EEL35.4	C205.4	3	2	0
21EEL35.5	C205.5	3	2	2
21EEL35	C205	3	2	0.8

Course Name: Social Connect and Responsibility

Subject Code: - 21SCR36, C206 Year of Study 2022-23

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21SCR36.1	C206.1			3
21SCR36.2	C206.2			3
21SCR36.3	C206.3			3
21SCR36	C206			3

Course Name: - Samskrutika Kannada

Subject Code: - 21KSK37, C207 Year of Study 2022-23

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21KSK37.1	C207.1	-	-	-
21KSK37.2	C207.2	-	-	-
21KSK37.3	C207.3	-	-	-
21KSK37.4	C207.4	-	-	-
21KSK37	C207	-	-	-

Course Name: - Balake Kannada (Kannada for Usage)

Subject Code: -21KBK37, C208 Year of Study 2022-23

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21KBK37.1	C208.1	-	-	-
21KBK37.2	C208.2	-	-	-
21KBK37.3	C208.3	-	-	-
21KBK37.4	C208.4	-	-	-
21KSBK37.5	C208.5	-	-	-
21KBK37	C208	-	-	-

Course Name: Circuit Laboratory using Pspic

Subject Code: - 21EEL382, C209 Year of Study 2022-23

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EE381.1	C209.1	2	2	3
21EE381	C209	2	2	3

Course Name: Complex Analysis, Probability and Linear Programming.

Subject Code: - 21MAT41, C210 Year of Study 2022-23

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21MAT41.1	C210.1	2		
21MAT41.2	C210.2	2		
21MAT41.3	C210.3	2		
21MAT41.4	C210.4	2		
21MAT41.5	C210.5	2		
21MAT41	C210	2		

Course Name: Digital System Design

Subject Code: - 21EE42, C211 Year of Study 2022-23

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EE42.1	C211.1	3	2	0
21EE42.2	C211.2	3	2	0
21EE42.3	C211.3	3	2	0
21EE42.4	C211.4	3	2	0
21EE42.5	C211.5	2	3	0
21EE42.6	C211.6	3	2	0
21EE42.7	C211.7	3	2	2
21EE42	C211	2.86	2.14	0.29

Course Name: Microcontroller

Subject Code: - 21EE43, C212 Year of Study 2022-23

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EE43.1	C212.1	3	2	0
21EE43.2	C212.2	3	2	0
21EE43.3	C212.3	3	3	2
21EE43.4	C212.4	3	3	2
21EE43.5	C212.5	3	3	2
21EE43	C212	3	2.6	1.2

Course Name: Electric Motors

Subject Code: - 21EE44, C213 Year of Study 2022-23

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EE44.1	C213.1	3	2	1

NBA SAR CRITERIA 3

21EE44.2	C213.2	3	2	1
21EE44.3	C213.3	3	2	2
21EE44.4	C213.4	3	2	2
21EE44.5	C213.5	3	2	1
21EE44	C213	3	2	1.04

Course Name: Biology for Engineers

Subject Code: - 21BE45, C214 Year of Study 2022-23

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21BE45.1	C214.1	1	1	1
21BE45.2	C214.2	1	1	1
21BE45.3	C214.3	1	1	1
21BE45.4	C214.4	1	1	1
21BE45	C214	1	1	1

Course Name: Electrical Machines Laboratory - 2

Subject Code: - 21EEL46, C215 Year of Study 2022-23

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EEL46.1	C215.1	3	2	1
21EEL46.2	C215.2	3	2	1
21EEL46.3	C215.3	3	2	2
21EEL46.4	C215.4	3	2	2
21EEL46.5	C215.5	3	2	1
21EEL46	C215	3	2	1.40

Course Name: Constitution of India and Professional Ethics

Subject Code: - 21CIP47, C216 Year of Study 2022-23

CO – PSO MAPPING				
-------------------------	--	--	--	--

CO Code	NBA Code	PSO1	PSO2	PSO3
21CIP37.1	C216.1			3
21CIP37.2	C216.2			3
21CIP37.3	C216.3			3
21CIP37.4	C216.4			3
21CIP37.5	C216.5			3
21CIP37	C216			3

Course Name Simulation of Op-Amp Circuits

Subject Code: - 21EEL484, C217 Year of Study 2022-23

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EE481.1	C217.1	1		
21EE481	C217	1		

Course Name: Universal Human Values/ UNDERSTANDING HARMONY and ETHICAL HUMAN CONDUCT

Subject Code: - 21UHV49, C218 Year of Study 2022-23

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21UHV49.1	C218.1			3
21UHV49	C218			3

Course Name: Inter/Intra Institutional Internship

Subject Code: - 21INT49, C219 Year of Study 2022-23

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3

21INT49.1	C219.1	3	3	2
21INT49.2	C219.2	1	2	3
21INT49.3	C219.3	3	3	2
21INT49.4	C219.4	1	2	3
21INT49.5	C219.5	2	1	3
21INT49	C219	2	2.20	2.60

Course Name: Transmission and Distribution

Subject Code: - 21EE51, C301 Year of Study 2023-24

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EE51.1	C301.1	3	2	1
21EE51.2	C301.2	3	2	1
21EE51.3	C301.3	3	2	1
21EE51.4	C301.4	3	2	1
21EE51.5	C301.5	3	2	2
21EE51	C301	3	2	1.20

Course Name: Control Systems

Subject Code: - 21EE52, C302 Year of Study 2023-24

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EE52.1	C302.1	3	2	1
21EE52.2	C302.2	3	2	1
21EE52.3	C302.3	3	2	1
21EE52.4	C302.4	3	2	1
21EE52.5	C302.5	3	2	1
21EE52.5	C302.6	3	3	2

21EE52.5	C302.7	3	3	2
21EE52.5	C302.8	3	2	1
21EE52.5	C302.9	3	2	2
21EE52.5	C302.10	3	3	2
21EE52	C302	3	2.2	1.4

Course Name: Power System Analysis - 1

Subject Code: - 21EE53, C303 Year of Study 2023-24

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EE53.1	C303.1	3	2	1
21EE53.2	C303.2	3	2	1
21EE53.3	C303.3	3	2	1
21EE53.4	C303.4	3	2	1
21EE53.5	C303.5	3	2	1
21EE53	C303	3	2	1

Course Name: Power Electronics

Subject Code: - 21EE54, C304 Year of Study 2023-24

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EE54.1	C304.1	3	2	1
21EE54.2	C304.2	3	2	1
21EE54.3	C304.3	3	2	1
21EE54.4	C304.4	3	2	1
21EE54.5	C304.5	3	2	1
21EE54	C304	3	2	1

Course Name: Power Electronics Laboratory

Subject Code: - 21EEL55, C305 Year of Study 2023-24

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EEL55.1	C305.1	3	2	1
21EEL55.2	C305.2	3	2	1
21EEL55.3	C305.3	3	2	1
21EEL55.4	C305.4	3	2	1
21EEL55.5	C305.5	3	2	1
21EEL55	C305	3	2	1

Course Name: Research Methodology & Intellectual Property Rights

Subject Code: - 21RMI56, C306 Year of Study 2023-24

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21RMI56.1	C306.1	1	2	3
21RMI56.2	C306.2	1	2	3
21RMI56.3	C306.3	1	2	3
21RMI56.4	C306.4	1	2	3
21RMI56.5	C306.5	1	2	3
21RMI56	C306	1	2	3

Course Name: Environmental Studies

Subject Code: - 21CIV57, C307 Year of Study 2023-24

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21CIV57.1	C307.1	1	2	3
21CIV57.2	C307.2	1	2	3
21CIV57.3	C307.3	1	2	3
21CIV57.4	C307.4	1	2	3

21CIV57	C307	1	2	3
----------------	-------------	----------	----------	----------

Course Name: Renewable Energy Projects

Subject Code: - 21EEP584, C308 Year of Study 2023-24

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EE582.1	C308.1	2	3	2
21EE582	C308	2	3	2

Course Name: Management and Entrepreneurship

Subject Code: - 21EE61, C309 Year of Study 2023-24

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EE61.1	C309.1	1	2	3
21EE61.2	C309.2	1	2	3
21EE61.3	C309.3	1	2	3
21EE61.4	C309.4	1	2	3
21EE61.5	C309.5	1	2	3
21EE61	C309	1	2	3

Course Name: Power System Analysis - 2

Subject Code: - 21EE62, C310 Year of Study 2023-24

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EE62.1	C310.1	3	2	1
21EE62.2	C310.2	3	2	1
21EE62.3	C310.3	3	2	1
21EE62.4	C310.4	3	2	1
21EE62.5	C310.5	3	2	1
21EE62.6	C310.6	3	3	1

21EE62.7	C310.7	3	3	1
21EE62.8	C310.8	3	3	1
21EE62.9	C310.9	3	3	1
21EE62.10	C310.10	3	2	1
21EE62.11	C310.11	3	2	1
21EE62.12	C310.12	3	2	1
21EE62	C310	3	2.58	1

Course Name: Signals and Digital Signal Processing

Subject Code: - 21EE63, C311 Year of Study 2023-24

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EE63.1	C311.1	2		
21EE63.2	C311.2	2		
21EE63.3	C311.3	2		
21EE63.4	C311.4	2		
21EE63.5	C311.5	2		
21EE63	C311	2		

Course Name: Electrical Engineering Materials

Subject Code: - 21EE644, C312 Year of Study 2023-24

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EE644.1	C312.1	3	2	1
21EE644.2	C312.2	3	2	1
21EE644.3	C312.3	3	2	1
21EE644.4	C312.4	2	2	1
21EE644	C312	2.75	2	1

Course Name: Renewable Energy Power Plant

Subject Code: - 21EE652, C313 Year of Study 2023-24

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EE652.1	C313.1	2	2	3
21EE652.2	C313.2	2	3	2
21EE652.3	C313.3	3	3	1
21EE652.4	C313.4	3	2	2
21EE652.5	C313.5	2	3	2
21EE652.6	C313.6	2	2	3
21EE652	C313	2.33	2.67	2

Course Name: Digital Signal Processing Laboratory

Subject Code: - 21EEL66, C314 Year of Study 2023-24

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EEL66.1	C314.1	3	2	1
21EEL66.2	C314.2	3	2	1
21EEL66.3	C314.3	3	2	1
21EEL66.4	C314.4	3	2	1
21EEL66.5	C314.5	3	3	1
21EEL66.6	C314.6	3	2	1
21EEL66	C314	3	2.33	1

Course Name: Mini Project

Subject Code: - 21EEMP67, C315 Year of Study 2023-24

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EEMP67.1	C315.1	3	2	1

21EEMP67.2	C315.2	3	3	1
21EEMP67.3	C315.3	2	2	3
21EEMP67.4	C315.4	3	2	2
21EEMP67.5	C315.5	1	1	3
21EEMP67	C315	2.4	2	2

Course Name: -Innovation/Entrepreneurship/Societal Internship

Subject Code: - 21INT68, C316 Year of Study 2023-24

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21INT68.1	C316.1	1	2	2
21INT68.2	C316.2	1	3	2
21INT68.3	C316.3	1	3	2
21INT68.4	C316.4	2	3	2
21INT68.5	C316.5	1	1	3
21INT68	C316	1.2	2.4	2.2

Course Name: High Voltage and Power System Protection

Subject Code: - 21EE71, C401 Year of Study 2024-25

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EE71.1	C401.1	3	2	1
21EE71.2	C401.2	3	2	1
21EE71.3	C401.3	3	2	1
21EE71.4	C401.4	3	2	1
21EE71.5	C401.5	3	2	1
21EE71.6	C401.6	3	2	1
21EE71.7	C401.7	3	2	1
21EE71.9	C401.8	3	2	2
21EE71	C401	3	2	1.22

Course Name: Power System Operation and Control

Subject Code: - 21EE72, C402 Year of Study 2024-25

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EE72.1	C402.1	3	2	1
21EE72.2	C402.2	3	2	1
21EE72.3	C402.3	3	2	1
21EE72.4	C402.4	3	2	1
21EE72.5	C402.5	3	2	2
21EE72	C402	3	2	1.20

Course Name: Power System Planning

Subject Code: - 21EE731, C403 Year of Study 2024-25

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EE731.1	C403.1	3	3	1
21EE731.2	C403.2	2	3	2
21EE731.3	C403.3	3	2	1
21EE731.4	C403.4	3	2	1
21EE731.5	C403.5	3	2	2
21EE731.6	C403.6	3	3	1
21EE731	C403	2.67	2.50	1.67

Course Name: Industrial Drives and Applications

Subject Code: - 21EE744, C404 Year of Study 2024-25

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EE744.1	C404.1	3	2	1
21EE744.2	C404.2	3	2	1

21EE744.3	C404.3	3	2	2
21EE744.4	C404.4	3	2	1
21EE744.5	C404.5	3	2	1
21EE744	C404	3	2	1.2

Course Name: NON-TRADITIONAL MACHINING

Subject Code: - 21ME751, C405 Year of Study 2024-25

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21ME751.1	C405.1	2	3	1
21ME751.2	C405.2	3	3	1
21ME751.3	C405.3	3	3	1
21ME751.4	C405.4	3	3	1
21ME751.5	C405.5	3	3	1
21ME751	C405	2.80	3	1

Course Name: Project work

Subject Code: - 21EEP76, C406 Year of Study 2024-25

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EEP76.1	C406.1	3	2	1
21EEP76.2	C406.2	2	3	1
21EEP76.3	C406.3	1	2	3
21EEP76.4	C406.4	1	1	3
21EEP76.5	C406.5	1	1	3
21EEP76	C406	1.6	1.8	2.2

Course Name: Technical Seminar

Subject Code: - 21EE81, C407 Year of Study 2024-25

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EE81.1	C407.1	2	2	1
21EE81.2	C407.2	1	1	3
21EE81.3	C407.3	2	1	2
21EE81.4	C407.4	1	1	3
21EE81.5	C407.5	1	1	3
21EE81	C407	1.4	1.2	2.4

Course Name: Industrial Internship

Subject Code: - 21INT822, C408 Year of Study 2024-25

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21INT822.1	C408.1	3	2	1
21INT822.2	C408.2	3	2	1
21INT822.3	C408.3	2	2	2
21INT822.4	C408.4	1	1	3
21INT822.5	C408.5	1	1	3
21INT822	C408	2	1.6	2

3.1.3. Program level Course-PO/PSO matrix of all courses INCLUDING first year courses (10)

[illegible]

NBA SAR CRITERIA 3

C116	21EEL27	2	1				1			1	1					
C117	21EGH28									1	3		1			
C118	21IDT29	1	1										1			
C201	21MAT31	3	3	2										2		
C202	21EE32	3	2	2.33	-	2.2								3	2.83	0
C203	21EE33	3	2.2	2	2	2								3	2	
C204	21EE34	3	2.6	1.6	-	2								3	2	
C205	21EEL35	3	2.4	2.4		2								3	2	0.8
C206	21SCR36						3	3	3	3	3		3			3
C207	21KSK37									2	3		3			
C208	21KBK37									2	3		3			
C209	21EEL382	3	3	3		3								2	2	3
C210	21MATME41	3	3	2										2		
C211	21EE42	3	2.28	2.57	2	2								2.86	2.14	0.29
C212	21EE43	3	2.8	2.4	2	2.4								3	2.6	1.2
C213	21EE44	3	2.4	2	2	2								3	2	1.04
C214	21BE45	3	3	0.25										1	1	1
C215	21EEL46	3	3	1	3					3	3			3	2	1.40
C216	21CIP47						3		3	2	3		3			3

NBA SAR CRITERIA 3

C217	21EE484	3	3	3		3								1		
C218	21UHV49						3		3	2			3			3
C219	21INT49	2	1	1	2		2			2	2		1	2	2.20	2.60
C301	21EE51	3	2.4	2			2	1					1	3	2	1.20
C302	21EE52	3	2.8	2.5	2.15	2.57				1	1		2	3	2.2	1.4
C303	21EE53	3	3	2	2	3								3	2	1
C304	21EE54	3	2.4	2	2									3	2	1
C305	21EEL55	3	3	2.75	2	2								3	2	1
C306	21RMI56						3		3	2	3		3	1	2	3
C307	21CIV57						3	3					3	1	2	3
C308	21EEP584	3	3	3		3								2	3	2
C309	21EE61						2.5	2	3	2.5	2.33	2.5	2	1	2	3
C310	21EE62	3	2.83	2	2.37	2.63						3	2	3	2.58	1
C311	21EE63	3	3	3	1.8		0.6							3	2	1
C312	21EE644	3	2										2	2.75	2	1
C313	21EE652	3	3				2	2						2.33	2.67	2
C314	21EEL66	2.83	2.66	1.66	2	2.5				1	1			3	2.33	1
C315	21EEMP67	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.4	2	2
C316	21INT68	1	1	1	1	1	1	1	1	1	1	1	1	1.2	2.4	2.2
C401	21EE71	3	2.33	2.5	2.25	2.5				2	2		2	3	2	1.22

NBA SAR CRITERIA 3

C402	21EE72	3	2.6	2	2	2							2	3	2	1.20
C403	21EE731	3	2.5	2	2	2	2	2					2	2.67	2.50	1.67
C404	21EE744	3	3	1.5	0.75		1.5	1.5						3	2	1.2
C405	21ME751	3	3	3	3	3	3	3	3	3	3	3	3	2.80	3	1
C406	21EEP76	3	3	3	3	2	2	3	3	3	3	3	3	1.6	1.8	2.2
C407	21EE81	3	3	3					1	3	3			1.4	1.2	2.4
C408	21INT822		2	2	3	1	3		1	2	3	2		2	1.6	2

3.2. Attainment of Course Outcomes

3.2.1. Describe the assessment processes used to gather the data upon which the evaluation of Course Outcome is based

3.2.1. A. List of assessment processes

As an institution affiliated with Visvesvaraya Technological University (VTU), we are required to strictly follow the University curriculum and assessment methods. The university mandates direct assessment of students through internal assessments, assignments, continuous evaluation, seminars, projects, internships, Quiz etc. The indirect assessment tools, developed and implemented by the college, may include course exit surveys, program exit surveys, alumni surveys, employer surveys, and similar feedback mechanisms, etc.

The details of the above assessment tools are elucidated in Table.3.2.1.A.1 and Table.3.2.1.A.2, and in the flowchart depicted in Figure.3.2.1.A.1

Table 3.2.1.A.1 List and Description of Direct Assessment Methods.

Sl. No.	Direct Assessment Methods	Description
1	Internal Assessment Test	Two Internal Assessments are conducted for each theory subject under the Integrated Professional Core Course (IPCC) in every semester. Three Internal Assessments are conducted for each theory subject under the Professional Core Course (PCC) in every semester. The average internal assessment marks for a theory subject shall be based on scheme as prescribed by the University.
2	Laboratory Internal Assessment Test	One internal assessment is conducted in every semester for each Laboratory subject. The internal assessment test marks for a laboratory shall be based on Experimental procedure write-up, conduct of experiment, results, procedural knowledge and viva voce. Continuous Evaluation is implemented for the day-to-day conduct of laboratory experiments. Marks are awarded based on attendance, record/write-up, and the performance of experiments as defined in rubrics.

3	Seminar (Internal Assessment)	The internal assessment marks in the case of seminars in the final year shall be based on the evaluation by a committee comprising Head of Department, seminar coordinator and senior faculty members as per rubrics prepared by the college IQAC.
4	Project Viva Voce (Internal Assessment)	The internal assessment marks in the case of project in the final year shall be based on evaluation of one feasibility seminar and two progress seminars by a committee comprising Head of Department, project coordinator, senior faculty members and project guide as per rubrics prepared by the college IQAC.
5	Semester Examination - Theory (External Assessment)	Theory examinations are conducted as per university guidelines, and evaluation is carried out at the university level. The final marks obtained by the student are considered for assessment.
6	Semester Examination- Laboratory (External Assessment)	At the end of each semester practical examinations are conducted for laboratory subjects. These examinations focus on the experimental procedure write-up, execution of the experiment, and viva-voce, aiming to assess the attainment of the respective course outcome. External examiner will be allotted by the university and examination is carried out as per the university guidelines.
7	Project (External Assessment)	At the end of 7 th semester, the Project viva voce is conducted. The external assessment marks in the case of project viva voce in the final year shall be based on evaluation of presentation and project report by a committee comprising of internal and external examiner. External examiner will be allotted by the university and examination is carried out as per the university guidelines.

Table 3.2.1.A.2. List and Description of Indirect Assessment Methods.

Sl. No.	Indirect Assessment Methods	Description
1	Course Exit Survey	Course exit survey is carried out at the end of course. Course exit survey assesses opinions or

		thoughts about the knowledge acquired by students in respective theory courses.
2	Program Exit Survey	The program exit survey is carried out at the end of the program. It identifies twelve broad learning outcomes related to graduate attributes and Student's views are then captured for evaluating the indirect assessment.
3	Alumni Survey	Alumni Survey is collected after graduation. It captures alumni view points towards quality of instructions received, with all the areas of their education- from academic experiences to student experiences (Campus life, extra-curricular activities) for continuous improvement.
4	Employer survey	Employer survey is taken after employment. It is indicative of the graduate's overall expertise in Mechanical engineering, his/her communication skills, personal attributes and interpersonal skills.

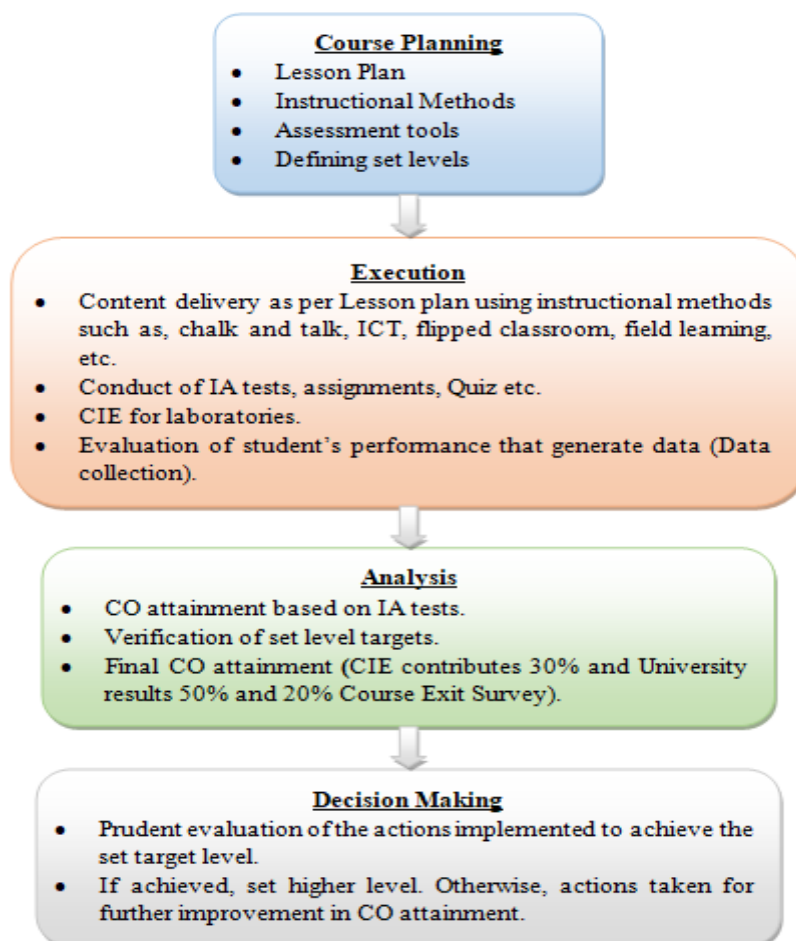


Figure 3.2.1.A.1: Flow chart for Direct and Indirect assessment tools.

In addition, at AITM, we aim to implement cognitive assessments that offer a holistic view of student progress. These assessments are designed to reveal not only academic performance but also creativity, communication abilities, and other inherent strengths such as cultural involvement, co-curricular participation, and leadership skills.

3.2.1. B. The quality/relevance of assessment processes & tools used

To ensure the attainment of Course Outcomes (COs), the department employs well-structured and quality-assured assessment processes. These processes are continuously reviewed and updated to maintain their validity, reliability, and relevance in measuring student learning outcomes. The following points illustrate the quality and effectiveness of the assessment methods and tools.

1. Quality and Relevance of Direct Assessment Tools

The direct assessment tools at AITM are structured to evaluate both theoretical and practical knowledge and are designed using principles of Bloom's Taxonomy. These tools include.

- **Internal Assessment Tests (IATs):**

Conducted two or three times per semester (depending on the course type: IPCC or PCC), these tests are mapped to specific COs and are designed using Bloom's Taxonomy to incorporate multiple cognitive levels—remembering, understanding, applying, and analyzing. The best of two scores are considered for fairness and consistency.

- **Laboratory Internal Assessment:**

Internal lab assessments include continuous evaluation based on structured rubrics that cover attendance, record quality, performance, and viva-voce. This ensures a fair and consistent judgment of students' hands-on skills and conceptual clarity.

- **Seminar and Project Internal Assessments:**

Final-year seminars and projects are assessed through well-defined rubrics developed by the college IQAC, focusing on technical content, innovation, presentation skills, teamwork, and feasibility. Evaluation is done by a panel

consisting of the HOD, coordinators, and senior faculty members, ensuring objectivity and comprehensiveness.

- **University End-Semester Exams (Theory and Practical):**

These assessments are conducted and evaluated by VTU-appointed external examiners to ensure standardization across affiliated institutions. They include theoretical understanding, problem-solving skills, and practical execution, thus aligning well with university norms and OBE objectives.

2. Quality and Relevance of Indirect Assessment Tools

To complement direct assessments, AITM implements several indirect tools to gather stakeholder feedback and evaluate learning outcomes from different perspectives:

- **Course Exit Survey:**

Collected at the end of each course to understand students' perceptions about teaching-learning effectiveness and content understanding.

Feedback is analyzed to make improvements in pedagogy and curriculum delivery.

- **Program Exit Survey:**

Taken at the end of the degree program, this survey evaluates the attainment of broad graduate attributes. It serves as an important input for program revision and continuous improvement.

- **Alumni Survey:**

Gathered from graduates to assess the long-term effectiveness of the program. It captures their perspectives on academic and non-academic experiences and relevance of curriculum in real-world applications.

- **Employer Survey:**

Collected from companies and organizations that recruit AITM graduates. The survey focuses on technical knowledge, communication skills, work ethics, and team collaboration abilities of our alumni.

3.2.2. Record the attainment of Course Outcomes of all courses with respect to set attainment levels (40)

3.2.2. A.1. Methodology to define set levels and its compliance

Process of setting target level for CO attainment

Step 1: Initially (at the beginning of university scheme) the target level for CO attainment is set in terms of percentage. To begin with, 35% as the base value for all COs in every course.

Step 2: The target levels are set as 1, 2 and 3 based on attainment percentages as shown in Table.3.2.2.A.1.

Table.3.2.2.A.1: Setting of target level.

CO Attainment		
Sl. No	Attainment Percentage	Target level
1	35-60	1
2	61-70	2
3	71-100	3

Step 3: If set target levels are achieved, target levels are increased for subsequent years. Otherwise, necessary actions in content delivery are planned. The actions taken thereof may include conduct of tutorial classes, giving additional assignments, reframing question papers, etc. to attain the set target levels.

3.2.2. A.2. Data Collection, verification, analysis and decision making

The methodology adopted for data collection, verification, analysis and attainment of Course Outcomes (COs) for an engineering course Mechanical Engineering program is depicted in Figure.3.2.2.A.2. Process of Data collection, verification, analysis and decision making.

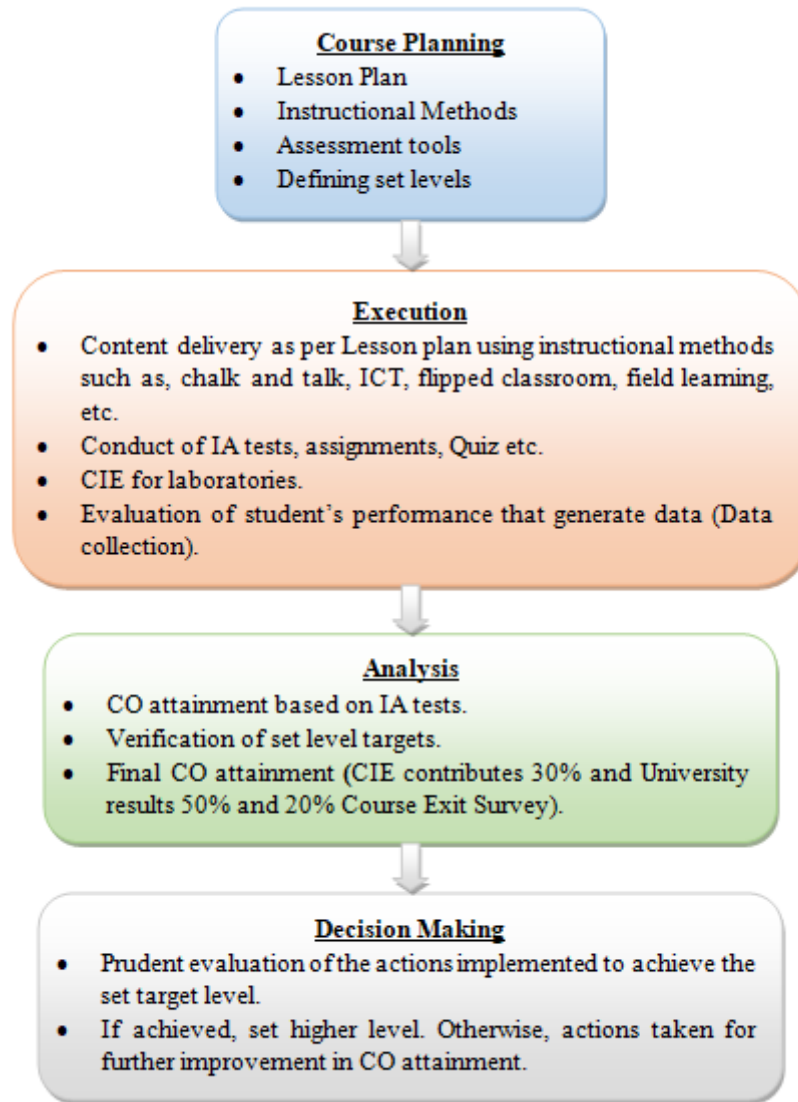


Figure 3.2.2.A.2: Process of Data collection, verification, analysis and decision making.

The Sample Course under study is a theory course of Electrical and Electronics Engineering Program – 21EE63 – Signals and Digital signal Processing.

Table.3.2.2.A.2.1: Data Collection for a Course outcomes and internal assessment test for CO Mapping

COURSE OUTCOME - DETAILS							
Course Outcome	Description						
21EE63.1	Discuss classification and basic operations that can be performed on both continuous and discrete time signals.						
21EE63.2	Evaluate Discrete Fourier Transform of a sequence and the convolution of two sequences to determine the output sequence.						
21EE63.3	Evaluate Discrete Fourier Transform of a sequence by using fast methods.						
21EE63.4	Design Butterworth and Chebyshev IIR digital filters and FIR filters using different techniques.						
21EE63.5	Develop different structures for IIR and FIR filters.						
CIE TEST- COURSE OUTCOME MAPPING							
Question No	IA - I		IA - II		Question No	IA-III	
	CO Mapping	Marks	CO Mapping	Marks		CO Mapping	Marks
Q1. (A)	CO1	5	CO2	5	Q1. (A)	CO4	10
Q1. (B)	CO1	5	CO2	5	Q1. (B)		
Q2. (A)	CO1	5	CO2	5	Q2. (A)	CO4	10
Q2. (B)	CO1	5	CO2	5	Q2. (B)		
Q3. (A)	CO1	5	CO3	5	Q3.(A)	CO5	10
Q3. (B)	CO1	5	CO3	5	Q3. (B)		
Q4. (A)	CO1	5	CO3	5	Q4. (A)	CO5	10
Q4. (B)	CO1	5	CO3	5	Q4. (B)		

Table.3.2.2.A.2.2: Data Collection for a Course (CO Attainment through University Results)

UNIVERSITY RESULT			
S.No.	USN	Name of Student	Marks
1	2AG21EE001	Aditya Kulkarni	31
2	2AG21EE002	Aman A Wakilkar	28
3	2AG21EE003	Deepthi S. Kurbet	10
4	2AG21EE004	Deepti V Chougale	34
5	2AG21EE005	Dhaneshwari B Jambagi	18
6	2AG21EE007	Mallu Arutagi	6
7	2AG21EE008	Pradeep Aravattu	25
8	2AG21EE009	Prerana S Panchakattimath	36
9	2AG21EE010	Rohan M Navalagi	22
10	2AG21EE011	Sagar S Rathod	26
11	2AG21EE012	Shivabasayya H Mathad	29
12	2AG21EE013	Sriram Deshpande	31
13	2AG21EE014	Spoorti P. Tattimani	27
14	2AG21EE015	Shruti Anil Magi	20
15	2AG21EE016	Sunita S. Shidagoudar	34
16	2AG22EE400	Balachandra Sugate	24
17	2AG22EE401	Basavraj Aniigeri	18
18	2AG22EE402	Ganesh K K	5
19	2AG22EE403	Gangadhar M Mulakunda	1
20	2AG22EE405	Rahul Meeshi	5
21	2AG22EE406	Saiyadnizamuddin M K	11
22	2AG22EE407	Sandesh A Mantri	18
23	2AG22EE408	Shashank M Gadad	8
24	2AG22EE409	Sridhar P D	18
CO ATTAINMENT		No. of students achieving set goal	17
		% Attainment	71
		Attainment Level	3

Sample calculation of CO attainment for University Result:

- Assessment for CO1,CO2,CO3,CO4,CO5 =** $\frac{\text{Number of Students achieving set goal}}{\text{Total Number of Students}}$
 $= \frac{17}{24} \times 100 = 70.83\% = 71\%$
- Attainment Level for University Result = 3

NBA SAR CRITERIA 3

Table.3.2.2.A.2.3: Data Collection for a Course (Direct method of CO attainment for an Internal Assessment test)

Total No of Students		24		IA - I												IA - II												IA - III												Theory Component							Final Avg
																																								Total IA	Assignment I	Assignment II	Sum	Quiz	IA+ASSIG+QUIZ		
				5	5	Total	5	5	Total	5	5	Total	5	5	Total	5	5	Total	5	5	Total	5	5	Total	10	0	Total	10	0	Total	10	0	Total	10	0	Total	60	10	10	Assignments	20	100					
USN	Name of Student	Q1(A)	Q1(B)	10	Q2(A)	Q2(B)	10	Q3(A)	Q3(B)	10	Q4(A)	Q4(B)	10	Q1(A)	Q1(B)	10	Q2(A)	Q2(B)	10	Q3(A)	Q3(B)	10	Q4(A)	Q4(B)	10	Q1(A)	Q1(B)	10	Q2(A)	Q2(B)	10	Q3(A)	Q3(B)	10	Q4(A)	Q4(B)	10			20	ALL CO's		ALL CO's				
2AG21EE001	Aditya Kulkarni	1	3	4			0			0	3	5	8	5	3	8			0	5		5			0	10		10			0			0	6		6	41	10	10	20	18	79	40			
2AG21EE002	Aman A Wankar	1	3	4			0			0	3	4	7	2	5	7			0	5		5			0	10		10			0			0	6		6	39	10	10	20	15	74	37			
2AG21EE003	Deepthi S. Kurbet	1	1	2			0			0	3	5	8	4		4			0		5	5			0	10		10			0			0			0	29	10	10	20	15	64	32			
2AG21EE004	Deepthi V Choigale	4	5	9			0			0	3	4	7	4	5	9			0	5		5			0	10		10			0			0	7		7	47	10	10	20	17	84	42			
2AG21EE005	Dhaneekwari B Jambagi	4	5	9			0			0	3	4	7			0		5	5		4	4			0			0	8		8	4		4		0	37	10	10	20	17	74	37				
2AG21EE007	Mallu Artagi	3	5	8			0	4	2	6			0			0	5		5		5	5			0			0	9		9			0	4		4	37	10	10	20	17	74	37			
2AG21EE008	Pradeep Aravattu	5	5	10			0			0			0			0		5	5	5	5		5		0	10		10			0	4		4		0	34	10	10	20	14	68	34				
2AG21EE009	Prerana S Panchakattimath	5	5	10			0	5	5	10			0			0	3	3	6	5	5	10			0			0	10		10			0	6		6	52	10	10	20	16	88	44			
2AG21EE010	Rohan M Navalgudi	1	3	4			0			0	5	5	10		5	5			0	3	5	8			0		0	10		10		4		4		0	41	10	10	20	17	78	39				
2AG21EE011	Sagar S Rethod	2	3	5			0	4	4	8			0	2	5	7			0	2		2			0			0	10		10			0	3		3	35	10	10	20	12	67	34			
2AG21EE012	Shirabacayya H Mahad	5		5			0		5	5			0			0		5	5		5	5			0			0	10		10			0	6		6	36	10	10	20	19	75	38			
2AG21EE013	Sriram Deshpande			0	4	5			0	5	5	10		3	3			0	2	5	7			0		10	10			0	5		5		0	40	10	10	20	18	78	39					
2AG21EE014	Spoorti P. Tattimai	2	4	6			0	5	6			0		1	5	6			0		5	5			0			0	10		10		3		3		0	36	10	10	20	18	74	37			
2AG21EE015	Shruti Anil Mogi	2	4	6			0	3	5	8			0	1	5	6			0	1	5	6			0			0		10	10	3		3		0	39	10	10	20	16	75	38				
2AG21EE016	Smriti S. Shirdogondar	5	5	10			0	4	5	9			0	5	3	8			0	4		4			0			0	10		10			0	10		10	51	10	10	20	16	87	44			
2AG22EE400	Balchondra Sagate	5	4	9			0		5	5			0			0	4	5	9	3		3			0	7		7			0	3		3		0	36	9	9	18	14	68	34				
2AG22EE401	Bazviraj Aniguri		5	5			0			0		5	5			0		5	5		5	5			0			0	10		10			0	2		2	32	9	9	18	14	64	32			
2AG22EE402	Ganesh K K	5		5			0	4	5	9			0			0	3	5	8		4	4			0			0	10		10			0		0	36	9	9	18	14	68	34				
2AG22EE403	Gangadhar M Mulakunda		5	5			0			0		5	5			0		5	5		5	5			0			0	10		10			0	3		3	33	9	9	18	11	62	31			
2AG22EE405	Rakul Meschi			0	4		4			0	5	5	10		5	5			0		5	5			0			0	8		8	4		4		0	36	8	8	16	12	64	32				
2AG22EE406	Saiyodhisamvuddin M K			0	5	1	6	5	3	8			0	3	5	8			0			0			0			0	10		10	4		4		0	36	10	10	20	13	69	35				
2AG22EE407	Sandeek A Mantri			0			0	5	5	10			0	4	5	9			0			0			0	10		10			0			0		0	29	10	9	19	17	65	33				
2AG22EE409	Shashank M Gadad	5	4	9			0	5	5	10			0			0	3	5	8	2		2			0	7		7	6		6	3		3		0	39	8	8	16	14	69	35				
2AG22EE409	Sridhar P D	4	3	7			0	4	4	8			0		5	5			0		5	5			0			0	8		8			0	6		6	39	8	8	16	16	71	36			

NBA SAR CRITERIA 3

CO Attainment	No of students achieving CO	18	18		3	2		11	13		8	10		10	13		5	9		12	14		0	0		8	1		15	1		10	0		11	0
	% Attainment of CO	75	75		13	8		46	54		33	42		42	54		21	38		50	58		0	0		33	4		63	4		42	0		46	0
	Attainment Level of CO	3	3		0	0		0	1		0	0		0	1		0	0		1	1		0	0		0	0		2	0		0	0		0	0

Sample calculation of CO attainment for Internal Assessment:

- **Assessment for CO1** = $\frac{\text{Total number of Students attempted in Particular Question CO1}}{\text{Total Number of Students}}$

$$\text{Assessment for CO1} = \frac{22}{25} \times 100 = 75\%$$

$$\text{Attainment Level of CO1} = 75\% = 3$$

- **Assessment for CO2** = $\frac{\text{Total number of Students attempted in Particular Question CO2}}{\text{Total Number of Students}}$

$$\text{Assessment for CO2} = \frac{13}{24} \times 100 = 54.16\%$$

$$\text{Attainment Level of CO2} = 54.16\% = 1$$

Similarly, calculation for CO3, CO4 and CO5 is computed.

Table 3.2.2.A.2.4: The Final CO attainment of an Internal Assessment tests for the above sample course.

Course Outcomes	Assessment %	Attainment Level	Other Assessment%	Attainment Level
CO1 – C303.1	75%	3	100	3
CO2 – C303.2	54%	1	100	3
CO3 – C303.3	58%	1	100	3
CO4 – C303.4	63%	2	100	3
CO5 – C303.5	46%	0	100	3

Table 3.2.2.A.2.5: The CO attainment for the Course Exit Survey.

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING								
Academic Year : 2023 - 2024, Semester - VI								
COURSE OUTCOME ATTAINMENT THROUGH COURSE EXIT SURVEY								
Class: A				Course: Signals and Digital Signal Processing				
Course Code: 21EE63				Faculty Name: Mr. Rajendra Ghivari				
Attainment Level			L1	L2		L3		
			35	60		70		
			More than 35 % students indicated attainment	More than 60 % students indicated attainment		More than 70 % students indicated attainment		
			1	2		3		
No. Of Students Indicated Level of Attainment								
Course Outcomes	Excellent (5)	Very Good (4)	Good (3)	Fair (2)	Poor (1)	Total	Percentage (Total X 100/No.Of Students X 5)	Level of Attainment
CO1	7	11	6	0	0	97	80.8	3
CO2	12	10	2	0	0	106	88.3	3
CO3	11	9	3	1	0	102	85.0	3
CO4	10	7	3	4	0	95	79.2	3
CO5	9	7	5	3	0	94	78.3	3

Sample calculation of CO attainment for Indirect Assessment:

- Indirect Assessment for CO1 = $\frac{\text{Total number of students indicated level}}{\text{Weighted feedback students} \times 5} \times 100$
- Indirect Assessment for CO1 = $\frac{(7 \times 5 + 11 \times 4 + 6 \times 3 + 0 \times 2 + 0 \times 1)}{(7 + 11 + 6 + 0 + 0) \times 5} \times 100 = 80.8\%$
- Indirect Assessment for CO2 = $\frac{(12 \times 5 + 10 \times 4 + 2 \times 3 + 0 \times 2 + 0 \times 1)}{(12 + 10 + 2 + 0 + 0) \times 5} \times 100 = 88.3\%$

Similarly calculation of CO3, CO4 and CO5 is computed.

Table 3.2.2.A.2.6: The Final CO attainment of Course Exit Survey for the above sample course.

Course Outcomes	Assessment %	Attainment Level
CO1 – C303.1	80.8	3
CO2 – C303.2	88.3	3
CO3 – C303.3	85.0	3
CO4 – C303.4	79.2	3
CO5 – C303.5	78.3	3

Table 3.2.2.A2.7: The Final CO Attainment for the above Course is University, Internal assessment and Course Exit Survey.

Course Outcomes	CO Attainment through University Assessment %	Attainment Level (A)	CO Attainment through Internal Assessment %	Attainment Level (B)	Other Assessment %	Attainment Level (C)	Course Exit Survey Assessment %	Attainment Level
CO1 – C303.1	71	3	75	3.00	100	3	80.8	3
CO2 – C303.2	71	3	54	1.00	100	3	88.3	3
CO3 – C303.3	71	3	58	1.00	100	3	85.0	3
CO4 – C303.4	71	3	63	2.00	100	3	79.2	3
CO5 – C303.5	71	3	46	1.00	100	3	78.3	3

Table 3.2.2.A2.8: The Final Total CO Attainment for the above Course is

Course Outcomes	University Attainment Level (A)	Internal Assessment Attainment Level (B)	Other Assessment Attainment Level (C)	Direct Attainment $(A \times 0.5 + B \times 0.25 + C \times 0.0.25)$ (D)	(Indirect Attainment) Course End Survey Attainment Level (E)	Total Attainment $(D \times 0.8 + E \times 0.2)$
CO1 – C303.1	3.00	3.00	3.00	3.00	3	3.00
CO2 – C303.2	3.00	1.00	3.00	2.50	3	2.60
CO3 – C303.3	3.00	1.00	3.00	2.50	3	2.60
CO4 – C303.4	3.00	2.00	3.00	2.75	3	2.80
CO5 – C303.5	3.00	1.00	3.00	2.50	3	2.60

3.3. Attainment of Program Outcomes and Program Specific Outcomes

3.3.1. Describe assessment tools and processes used for measuring the attainment of each of the Program Outcomes and Program Specific Outcomes

3.3.1. A List of assessment tools & processes

As per the assessment tools elucidated in 3.2.1.A1 and 3.2.1.A2. such as, direct attainment and indirect attainment is considered for program outcome attainment and program specific attainment. Further, indirect assessment may also include surveys for the technical talks, guest lectures, industrial visit, Hands-on training.

Sl. No.	Indirect Assessment Methods	Description
1	Technical Talks	The feedback is collected at the end of the technical talk which consists of parameters such as content, delivery, usefulness, etc.
2	Guest Lectures	The survey feedback is collected at the end of the guest lecture which consists of the purpose of lecture, outcomes of guest lecture, usefulness, etc.
3	Industrial Visit	The survey is carried out for industrial visits conducted based on the curriculum beyond syllabus, practical exposure, theoretical concepts, and use of modern technology and techniques about the management and organization of the industry.

3.3.1.B. Effective compliance, direct assessment methodology, indirect assessment formats-collection-analysis, decision making based on direct and indirect assessment.

The methodology adopted for effective compliance, direct and indirect assessment, analysis and decision making based on direct and indirect assessment. This methodology is depicted in Figure 3.3.1.B.1.

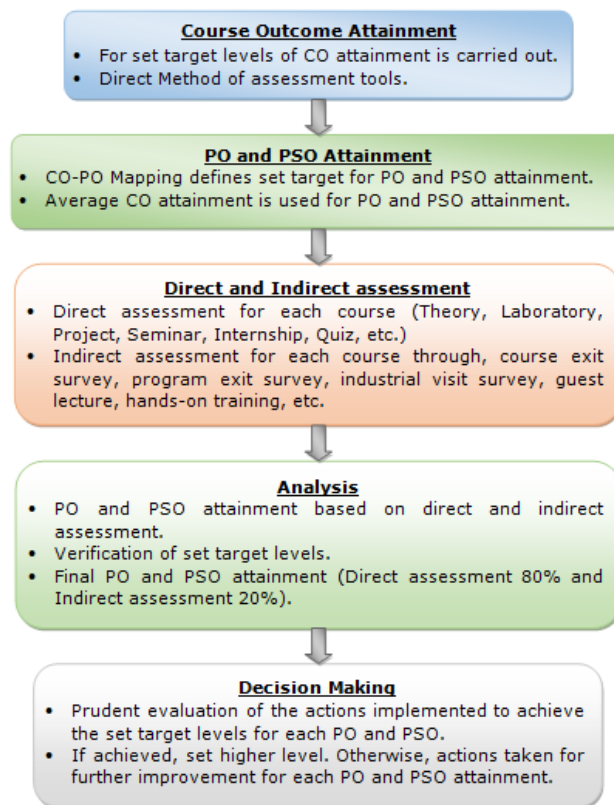


Figure 3.3.1.B.1: Methodology adopted for attainment of POs and PSOs.

3.3.2. Provide results of evaluation of each PO & PSO

3.3.2.A. Verification of documents, results and level of attainment of each PO/PSO

Details for POs & PSOs attainment for core courses

The Sample Course under study is a theory course of Electrical and Electronics Engineering Program – 21EE63 – Signals and Digital Signal Processing

Defining the target for attainment of POs and PSOs.

The Target level for POs and PSOs are set based on CO-PO Mapping carried out for each course. The sample setting of targets for POs is shown in Table 3.3.2.A.1

Course Name: Signals and Digital Signal Processing

Subject Code: - 21EE63, C303 Year of Study 2023-24

CO – PO MAPPING Design of RCC and Steel Structures

CO Code	NBA Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
21EE63.1	C303.1	3	2	0	0	1	3	0	0	0	0	0	0
21EE63.2	C303.2	3	3	2	0	1	3	0	0	0	0	0	0
21EE63.3	C303.3	3	3	2	0	2	3	0	0	0	0	0	0
21EE63.4	C303.4	3	3	3	0	2	3	0	0	0	0	0	0
21EE63.5	C303.5	3	2	3	0	2	3	0	0	0	0	0	0
21EE51	C303	3	2.6	2.0	0.0	1.6	3.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 3.3.2.A.1: Target level setting for POs through CO-PO Mapping.

The sample setting of targets for PSOs is shown in Table 3.3.2.A.2

CO – PSO MAPPING				
CO Code	NBA Code	PSO1	PSO2	PSO3
21EE63.1	C303.1	2		
21EE63.2	C303.2	2		
21EE63.3	C303.3	2		
21EE63.4	C303.4	2		
21EE63.5	C303.5	2		

21EE63	C303	2		
--------	------	---	--	--

Table 3.3.2.A.2: Target level setting for PSOs through CO-PSO Mapping.

The Final CO attainment for the above sample course as per the section **3.2.2.A.2.** is shown in Table 3.3.2.A.3.

Attainment	Assessment %	Attainment Level
CO1	88.04%	3
CO2	65.82%	2
CO3	100.00%	3
CO4	81.00%	3
CO5	88.33%	3

Table 3.3.2.A.3: Average CO Attainment Computed through Direct Assessment.

Direct Method for Attainment							
PO Attainment through CO-PO Mapping	INTERNAL		UNIVERSITY		Overall Attainment		
	Assessment	Attainment (X1)	Assessment	Attainment (X2)	Overall Attainment X1*40% + X2*60%	Target	Achievement
PO1 (CO1, CO2, CO3, CO4, CO5)	84.64%	3	61.13%	2	2.4	2	100%
PO2 (CO1, CO2, CO3, CO4, CO5)	84.64%	3	61.13%	2	2.4	2	100%
PO3 (CO1, CO2, CO3, CO4, CO5)	84.64%	3	61.13%	2	2.4	1.4	100%

Sample calculation of PO attainment:

Internal Assessment for PO1 (CO1, CO2, CO3, CO4, CO5) =

$$88.04 + 65.82 + 100.00 + 81.00 + 88.33 = 423.19$$

$$\text{Internal Assessment of PO1 (X1)} = \frac{\text{Assessment for PO1}}{\text{No. of Entries in PO1}} = \frac{423.19}{5} = 84.64\%$$

$$\text{Internal Attainment of PO1 (X1)} = 3.0$$

University Assessment for PO1 (X2) (CO1, CO2, CO3, CO4, CO5) = 61.13%

University Attainment for PO1 (X2) = 2.0

Direct Attainment for PO1 = Overall Attainment = (X1 x 40%) + (X2 x 60%)

= 40% of Internal Attainment of PO1 + 60% of University Attainment of PO1

= (3 x 0.4) + (2 x 0.6) = 2.4.

Direct Attainment for PO1 = 2.4

Target set for PO1 Attainment = 2.6

PO1 Achievement = $\frac{2.4}{2.6} = 92\%$

Similarly, calculation for PO2, PO3, PO4, and PO5 are computed.

Direct Method for Attainment							
PSO Attainment through CO-PO Mapping	INTERNAL		UNIVERSITY		Overall Attainment		
	Assessment	Attainment (X1)	Assessment	Attainment (X2)	Overall Attainment X1*40% + X2*60%	Target	Achievement
PSO1 (CO1, CO2, CO3, CO4, CO5)	84.64%	3	61.13%	2	2.4	2.6	92%
PSO2 (CO3, CO4, CO5)	89.78%	3	61.13%	2	2.4	3	80%
PSO3 (CO1, CO2, CO3, CO4, CO5)	84.64%	3	61.13%	2	2.4	1	100%

Sample calculation of PSO attainment:

Internal Assessment for PSO1 (CO1, CO2, CO3, CO4, CO5) =

88.04+65.82+100.00+81.00+88.33 = 423.19

Internal Assessment of PSO1 (X1) = $\frac{\text{Assessment for PSO1}}{\text{No. of Entries in PSO1}} = \frac{423.19}{5} = 84.64\%$

Internal Attainment of PSO1 (X1) = 3.0

University Assessment for PSO1 (X2) (CO1, CO2, CO3, CO4, CO5) = 61.13%

University Attainment for PSO1 (X2) = 2.0

Direct Attainment for PSO1 = Overall Attainment = (X1 x 40%) + (X2 x 60%)

= 40% of Internal Attainment of PSO1 + 60% of University Attainment of PSO1

= (3 x 0.4) + (2 x 0.6) = 2.4.

Direct Attainment for PSO1 = 2.4

Target set for PSO1 Attainment = 2.6

PSO1 Achievement = $\frac{2.4}{2.6} = 92\%$

Internal Assessment for PSO2 (CO3, CO4, CO5) = 100.00+81.00+88.33 = 269.33

Internal Assessment of PSO2 (X1) = $\frac{\text{Assessment for PSO2}}{\text{No. of Entries in PSO2}} = \frac{269.33}{3} = 89.78\%$

Internal Attainment of PSO1 (X1) = 3.0

University Assessment for PSO2 (X2) (CO3, CO4, CO5) = 61.13%

University Attainment for PSO2 (X2) = 2.0

Direct Attainment for PSO2 = Overall Attainment = (X1 x 40%) + (X2 x 60%)

= 40% of Internal Attainment of PSO2 + 60% of University Attainment of PSO2

= (3 x 0.4) + (2 x 0.6) = 2.4.

Direct Attainment for PSO2 = 2.4

Target set for PSO2 Attainment = 3.0

PSO2 Achievement = $\frac{2.4}{3.0} = 80\%$

Similarly, calculation for PSO3 is computed.

NBA SAR CRITERIA 3