LENDI INSTITUTE OF ENGINEERING AND TECHNOLOGY
An Autonomous Institution
Approved by AICTE & Permanently Affiliated to JNTUGV, Vizianagaram
Accredited by NAAC with "A" Grade and NBA (CSE, ECE, EEE & ME)
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Department of Electrical and Electronics Engineering

Course Outcomes (COs) of all Courses

2023-27 Batch (R23 Regulation)

Subject Name	NBA Code	Course Outcomes
Linear Algebra & Calculus	C101.1	Apply the Methods for solving linear equations to engineering applications.
	C101.2	Apply the concepts of eigen values and eigen vectors to free vibration of a two mass system.
	C101.3	Apply mean value theorems to real world problems.
	C101.4	Find maxima and minima of functions of several variables
	C101.5	Evaluate the volume and surface area of solids using multiple integrals.
Chemistry	C102.1	Categorize thermoplastics, thermosetting, elastomers conducting polymers and biodegradable polymers.
	C102.2	Determine the conductance and emf values of various solutions using conductivity meter and potentiometer. Compare the materials of construction for battery and electrochemical sensors.
	C102.3	Apply the principle of nanomaterials, semiconductors, superconductors, and super capacitors in preparing modern engineering materials
	C102.4	Demonstrate the construction and working hydro, geothermal, tidal and ocean thermal power plants.
	C102.5	Understand the construction and working of UV-Visible Spectro photo meter, IR spectroscopy and HPLC chromatography techniques

Subject Name	NBA Code	Course Outcomes
Introduction to Programming	C103.1	Understand the basics of Engineering Graphics to construct the polygon, curves and scales
	C103.2	Draw the orthographic projections of points and straight lines inclined to both the planes
	C103.3	Draw the projections of planes in various conditions
	C103.4	Draw the projections of regular solids, with its axis inclined to one plane and sections of solids
	C103.5	Visualize the 3D isometric views from 2D orthographic views and vice versa along with basic introduction to CAD
Engineering Graphics	C104.1	Understand the basics of Engineering Graphics to construct the polygon, curves and scales
	C104.2	Draw the orthographic projections of points and straight lines inclined to both the planes
	C104.3	Draw the projections of planes in various conditions
	C104.4	Draw the projections of regular solids, with its axis inclined to one plane and sections of solids
	C104.5	Visualize the 3D isometric views from 2D orthographic views and vice versa
Basic Electrical & Electronics Engineering	C105.1	Understand the problem solving concepts associated to dc and ac circuits.
	C105.2	Understand the principle and operation of basic electrical machines and measuring instruments
	C105.3	Identify the electricity bill calculations and layout representation of electrical power systems.
	C105.4	Understand the operation of various basic semiconductor devices.
	C105.5	Make use of the applications of semiconductor devices.
	C105.6	Analyze the different digital circuits
Chemistry Lab	C106.1	Determine the cell constant and conductance of different solutions.
	C106.2	Measure the strength of an acid present in secondary batteries.
	C106.3	Measure the strength of an acid present in secondary batteries.
	C106.4	Determine the amount of acidity of a given samples.
	C106.5	Calculate strength of iron present in a given sample.

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Computer Programming Lab	C107.1	Implement and execute the programs written in C language on Windows and Linux OS.
	C107.2	Apply conditional and iterative statements to solve real time scenarios in C.
	C107.3	Develop C programs which utilize memory efficiently through arrays and strings.
	C107.4	Develop programs to demonstrate the applications through user defined datatypes.
	C107.5	Construct programs using structures, unions, and files.
Electrical & Electronics Engineering Workshop	C108.1	Apply theoretical concepts to obtain calculations for the measurement of electrical parameters.
	C108.2	Analyse various characteristics of electrical circuits, electrical machines and measuring instruments.
	C108.3	Design suitable circuits and methodologies for the measurement of various electrical parameters; Household and commercial wiring.
	C108.4	Summarize the characteristics of various electronic devices.
	C108.5	Analyze the different digital circuits.
NSS/NCC/Scouts &Guides/Community Service	C109.1	Understand the importance of discipline, character and service motto.
	C109.2	Solve some societal issues by applying acquired knowledge, facts, and techniques.
	C109.3	Explore human relationships by analyzing social problems.
	C109.4	Determine to extend their help for the fellow beings and downtrodden people.
	C109.5	Develop leadership skills and civic responsibilities.
Differential Equations and Vector Calculus Differential Equations and Vector Calculus	C110.1	Solve the first order ordinary differential equations related to various engineering fields.
	C110.2	Solve the higher order differential equation and analyze physical situations.
	C110.3	Solve partial differential equations of first order and higher order related to engineering applications.
	C110.4	Apply vector differential operators to the real world situations
	C110.5	Estimate the work done against a field, circulation and flux using vector calculus.

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Engineering Physics	C111.1	Analyse the intensity variation of light due to polarization, interference and diffraction.
	C111.2	Identify the crystals structures with X-Ray diffraction principles.
	C111.3	Classify the various types of magnetic and dielectrics materials.
	C111.4	Explain the basic concepts of Quantum Mechanics and the band theory of solids.
	C111.5	Recognize the type of semiconductors using Hall Effect.
Communicative English	C112.1	learn how to understand the context, topic, and specific information from social or transactional dialogues.
	C112.2	learn remedially to apply grammatical structures to formulate sentences and use appropriate words and correct word forms.
	C112.3	improve communicative competence in formal and informal contexts and for social and academic purposes.
	C112.4	critically comprehend and appreciate reading /listening texts and write summaries based on global comprehension of these texts.
	C112.5	write coherent paragraphs, essays, letters/emails and resumes.
Basic Civil & Mechanical Engineering	C113.1	Understand the disciplines of Civil Engineering and their role in development of the society.
	C113.2	Apply the concepts of surveying for the measurement of distances, angles and levels
	C113.3	Explain the key elements of Transportation Engineering, Water Resources and Environmental Engineering
	C113.4	Identify the materials required for the specified applications.
	C113.5	Illustrate the principles of basic and advanced manufacturing processes
Electrical Circuit Analysis-I	C114.1	Understand the network reduction techniques
	C114.2	Analyze the magnetic circuits with dot convention
	C114.3	Identify the behavior of R, L and C with sinusoidal excitation
	C114.4	Apply the concepts to obtain various mathematical and graphical representations to electrical circuits.
	C114.5	Simplify complex electrical networks by using various network theorems

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Communicative English Lab	C115.1	Understand the different aspects of the English language oral communication with emphasis on Listening and Speaking Skills.
	C115.2	Apply communication skills through various language learning activities.
	C115.3	Analyze the English speech sounds, stress, rhythm and intonation for better listening and speaking comprehension.
	C115.4	Evaluate and exhibit professionalism in participating in debates and group discussions with polite turn-taking strategies and sound more professional while communicating with others
	C115.5	Create effective resonate and prepare them to face interviews and communicate appropriately in corporate settings.
Engineering Physics Lab	C116.1	Apply the working principles of laboratory experiments in optics, electrical and electronics.
	C116.2	Compute the required parameter by suitable formula using experimental values (observed values) in optics, electrical and electronic experiments.
	C116.3	Analyze the experimental results through graphical interpretation.
	C116.4	Recognize the required precautions to carry out the experiment and handling the apparatus in the laboratory.
	C116.5	Demonstrate the working principles, procedures and applications.
IT workshop	C117.1	Perform Hardware troubleshooting.
	C117.2	Understand Hardware components and inter dependencies.
	C117.3	Safeguard computer systems from viruses/worms.
	C117.4	Document/ Presentation preparation.
	C117.5	Perform calculations using spreadsheets.

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Engineering Workshop	C118.1	Identify workshop tools and their operational capabilities.
	C118.2	Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding.
	C118.3	Apply fitting operations in various applications.
	C118.4	Apply basic electrical engineering knowledge for House Wiring Practice
	C118.5	Prepare the pipe joint with couplings for same diameter and with reduced diameters for the given application.
Electrical Circuit Lab	C119.1	Understand the concepts of network theorems, node and mesh networks, series and parallel resonance and Locus diagrams.
	C119.2	Apply various theorems to compare practical results obtained with theoretical calculations.
	C119.3	Determine self, mutual inductances and coefficient of coupling values, parameters of choke coil
	C119.4	Analyse different circuit characteristics with the help of fundamental laws and various configurations.
	C119.5	Create locus diagrams of RL, RC series circuits and examine series and parallel resonance.
Health and Wellness, Yoga and Sports	C120.1	Understand the importance of yoga and sports for Physical fitness and sound health.
	C120.2	Demonstrate an understanding of health-related fitness components
	C120.3	Compare and contrast various activities that help enhance their health.
	C120.4	Assess current personal fitness levels.
	C120.5	Develop Positive Personality

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Transforms and Numerical Methods	C201.1	Apply Laplace transforms to solve the real world problems when modeled into differential equations.
	C201.2	Apply Z- transforms to solve the real world problems when modeled into difference equations
	C201.3	Apply suitable numerical methods to find the roots for given equation, interpolating formula for given data and solve real world problems when modeled into differential equations.
	C201.4	Analyze the data by fitting into regression lines using least square methods.
	C201.5	Apply suitable optimization techniques to solve the real world problems when modeled into linear and nonlinear optimization problems.
Universal Human Values: Understanding Harmony and Ethical Human Conduct	C202.1	Implement elements and process of value education.
	C202.2	Recognize thoughts, emotions and physical sensations of the self and the body and harmonizing their relationship.
	C202.3	Analyze human relations and their role in ensuring harmonious society.
	C202.4	Develop interconnected nature of existence encourages actions that contribute to global peace, justice and sustainability.
	C202.5	Make use of humanistic constitution, mutual respect and universal human order with holistic technologies.
Electromagnetic Field Theory	C203.1	Analyze the behavior of charges for different charge distributions using Coulombs Law and Gauss law.
	C203.2	Analyze the behavior of conductors and capacitance calculations for different configurations.
	C203.3	Analyze the magnetic fields by using Biot-Savartís law and Ampereís circuital law.
	C203.4	Analyze the effect of magnetic forces, inductances for different configurations in the transmission lines.
	C203.5	Understand Faraday's laws of electromagnetic induction, Maxwellís equations with static and time varying fields

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Electrical Circuit Analysis-II	C204.1	Analyse the balanced and unbalanced 3 phase circuits for power calculations.
	C204.2	Estimate various Network parameters.
	C204.3	Analyse the transient behaviour of electrical networks in different domains.
	C204.4	Apply the concept of Fourier series to electrical systems.
	C204.5	Describe the filter circuit for electrical circuits.
DC Machines & Transformers	C205.1	Understand the unifying principles of electromagnetic energy conversion
	C205.2	Analyze the operation & performance of DC Generators and Parallel Operation of DC Generators
	C205.3	Recognize the operation, performance of DC Motors, starting and speed control Techniques
	C205.4	Understand the operation & performance of single phase Transformers
	C205.5	Analyze the construction, classification of Three Phase Transformers & Autotransformers.
Electrical Circuit Analysis-II and Simulation Lab	C206.1	Evaluate the powers in three phase networks
	C206.2	Analyze the concepts of Transient response and time constants for the given circuits
	C206.3	Determine two port networks parameters for various combination of circuits
	C206.4	Construct the experimental network with suitable values of meters
	C206.5	Simulate and analyze electrical circuits using MATLAB/PSPICE tools
DC Machines & Transformers Lab	C207.1	Understand the principles and operational characteristics of DC Generators
	C207.2	Analyze the performance of DC Motors with direct and indirect loading
	C207.3	Understand the Speed Control Techniques of DC Shunt Motors
	C207.4	Evaluate the performance of single-phase Transformers
	C207.5	Achieve Three Phase to Two Phase Transformation

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Data Structures using C Lab (Skill Oriented Course)	C208.1	Identify the role of data structures in organizing and accessing data.
	C208.2	Design, implement, and apply linked lists for dynamic data storage.
	C208.3	Develop applications using stacks and queues.
	C208.4	Design and implement algorithms for operations on binary trees and binary Search trees.
	C208.5	Devise novel solutions to small scale programming challenges involving data structures such as stacks, queues, Trees.
Environmental Science (Mandatory Course)	C209.1	Understand the significance of various natural resources, including renewable, non renewable water, minerals, forests and soil, in the environment and the problems associated with it in maintaining ecological balance and supporting human activities.
	C209.2	Apply strategies for mitigating different types of environmental pollution, managing solid waste effectively and adopt individual actions that contribute to pollution prevention and waste reduction.
	C209.3	Understand the structure, function, characteristic features of different kind of eco systems, value of biodiversity, threats to bio diversity and India's role and strategies in the conservation of biodiversity for sustainable development.
	C209.4	Apply the Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife Protection Act, and Forest Conservation Act to promote sustainable environmental development; Address related social issues and propose effective solutions, delving into the intersection of environmental policies and community welfare to achieve ultimate sustainability goals.
	C209.5	Identify the role of information technology in addressing population-related problems, focusing on resource management, environmental monitoring, urban planning, healthcare improvement, education to enhance sustainability and quality of life.
Managerial Economics & Financial Analysis	C210.1	Equipped with the knowledge of fundamentals of economics, estimating the Demand for a product, Capable of analyzing Elasticity & Forecasting methods.
	C210.2	Apply production concepts, assess the costs and Determine Break Even Point (BEP) of an enterprise for managerial decision making.

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	C210.3	Identify the influence and price determination of various markets structures and knowledge of the forms of business organization and Business cycles.
	C210.4	Analyze how to invest adequate amount of capital in order to get maximum return from selected business activity.
	C210.5	Analyze and interpret the process & principles of accounting & apply financial statements for appropriate decisions to run the business profitably
Complex Variables and Statistical Methods	C211.1	Analyze various analytic functions using the Cauchy-Riemann equations
	C211.2	Apply various theorems of complex integration to solve engineering problems involving complex functions.
	C211.3	Analyze real-world engineering problems using the concepts of probability theory and statistical distributions in the process of assessment and decision-making under uncertainty.
	C211.4	Analyze data effectively to ensure accurate representation of populations in engineering studies and facilitate decision-making based on statistical inference using large sample tests.
	C211.5	Analyze data effectively to ensure accurate representation of populations in engineering studies and facilitate decision-making based on statistical inference using small sample tests
Power Systems-I	C212.1	Understand the different types of power plants, operation of hydroelectric and thermal power plants.
	C212.2	Understand the operation of nuclear power plants
	C212.3	Describe the different components of air and gas insulated substations
	C212.4	Discuss the construction of single core and three core cables and describe distribution system configurations.
	C212.5	Analyse different economic factors of power generation and tariffs.
Induction and Synchronous Machines	C213.1	Identify the speed control, testing and performance characteristics of three phase induction motor
	C213.2	Apply the concepts of time response analysis on first and second order systems (L3)
	C213.3	Test for Performance and synchronization of synchronous generator
	C213.4	Analyze the performance characteristics of synchronous motor
	C213.5	Describe the principle of operation of single-phase induction motors

Subject Name	NBA Code	Course Outcomes
Control Systems	C214.1	Determine overall transfer function using block diagram algebra and signal flow graphs.
	C214.2	Obtain the time response of first and specifications of second order systems and analyze the absolute and relative stability of LTI systems using Routh's stability criterion and root locus method
	C214.3	Analyze the stability of LTI systems using frequency response methods.
	C214.4	Design Lag, Lead, Lag-Lead compensators to improve system performance using Bode Diagrams
	C214.5	Apply state space analysis concepts to represent physical systems as state models
Induction and Synchronous Machines Lab	C215.1	Analyze the performance characteristics of AC machines by Effective Collaboration in teams
	C215.2	Apply speed control techniques on various AC machines that are required for project designs
	C215.3	Estimate how much reactive power is reduced by capacitor banks in order to abide by environmental requirements
	C215.4	Determine the voltage regulation using specific methods are applied in industrial alternators
	C215.5	Estimate the reliable data by Conducting tests accurately for AC motor performance evaluation by Prioritizing safety protocols
Control Systems Lab	C216.1	Analyse the time response of system (first order and second order system).
	C216.2	Design of PID controllers and compensators.
	C216.3	Determine the transfer function of D.C Motor
	C216.4	Judge the stability in time and frequency domain and Kalman's test for controllability and observability
	C216.5	Analyse the potentiometer and determine the state space analysis concepts to represent physical systems as state models in MATLAB
Python Programming Lab (Skill Oriented Course)	C217.1	Implement and debug simple Python programs.
	C217.2	Implement Python programs with Conditionals and Loops and functions.
	C217.3	Design and implement DOL, Star-Delta starters & control of three-phase induction motors using PLC for efficient motor control. (L3)
	C217.4	Interpret the concepts of Object-Oriented Programming as used in Python
	C217.5	Apply the Module Concepts and Packages for Real Time Applications

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Design Thinking & Innovation	C218.1	Explain the fundamentals of Design Thinking and innovation
	C218.2	Apply the design thinking techniques for solving problems in various sectors
	C218.3	Analyse to work in a multidisciplinary environment
	C218.4	Evaluate the value of creativity
	C218.5	Realise the technical communicative competence and attainment of grammatically correct Formulate specific problem statements of real time issues for formal communication (L2)
English For Employability Skills	C219.1	Enable students to identify Parts of Speech and use them flawlessly, write Emails in formal correspondence effectively, participate confidently by introducing oneself in any formal discussion.
	C219.2	Attain Language Proficiency & Accuracy through Contextualized Vocabulary, Verb forms, Tense and subject verb agreement, produce coherent expressions for professional writing, introduce themselves unhesitatingly with Task-Based Activities.
	C219.3	Develop the fluency and accuracy to write Technical Reports and Emails for professional communication by using appropriate vocabulary and participate confidently in any formal discussion.
	C219.4	Assimilate lifelong reading habit to comprehend a passage for its gist. Avoid the errors in both Speech & Writing and write Letters and Emails for official communication.Realise the technical communicative competence and attainment of grammatically correct structures for formal communication.
Renewable Energy Systems & Sources Honors Course-1(Track-1)	C220.1	Understand the basic concepts of solar radiation, its data on earth’s surface
	C220.2	Explain the different types of solar thermal energy collectors
	C220.3	Develop the maximum power point techniques in solar Photovoltaic Systems
	C220.4	Understand the Wind energy conversion systems and the various geothermal resources
	C220.5	Explain the methods of generation of electricity from tidal and chemical resources

Subject Name	NBA Code	Course Outcomes
Electric Vehicle Technology and Mobility Honors Course-1(Track-2)	C201.1	Describe the fundamental concepts and principles of Electric vehicles
	C201.2	Apply the battery technology for EVs
	C201.3	Apply the charging, Vehicle to X(V2X), X2V technology in EVs
	C201.4	Describe future technology for EVs such as Wireless charging, On-road charging, battery swap and solar powered EVs
	C201.5	Analyse the different policy perspectives and innovation in future mobility
Embedded System Design Honors Course-1(Track-3)	C202.1	Interpret embedded system and its hardware and software
	C202.2	Identify different characteristics and quality attributes of embedded systems
	C202.3	Explain role of firmware, and device driver programming
	C202.4	Illustrate different types of operating systems and Multitasking
	C202.5	Apply embedded Software development tools to design and develop the embedded system