B.Tech Electrical and Electronics Engineering (R25) Course Outcomes

Vardhaman College of Engineering, Hyderabad

Year & Semester	B.Tech I Year I Semester
Course Title	Matrices and Calculus
Course Code	A9001

Course Outcome No.	Course Outcome Statement
A9001.1	Solve system of equations using rank of a matrix.
A9001.2	Construct the canonical form of a quadratic form using orthogonal transformations.
A9001.3	Express a function in series by mean value theorems and evaluate improper integrals using Beta and Gamma functions.
A9001.4	Examine the extremum of a function of several variables.
A9001.5	Apply multiple integrals to find the areas and volumes.

Year & Semester	B.Tech I Year II Semester
Course Title	Ordinary Differential Equations and Vector Calculus
Course Code	A9002

Course Outcome No.	Course Outcome Statement
A9002.1	Make use of first order differential equations to solve real world problems.
A9002.2	Solve ordinary differential equations of higher order.
A9002.3	Apply Laplace transforms to solve ordinary differential equations.
A9002.4	Determine divergence and curl of a vector point function.
A9002.5	Compute line, surface, and volume integrals and convert them into one another using appropriate theorems.

Year & Semester	B.Tech II Year III Semester
Course Title	Numerical Methods and Complex Variables
Course Code	A9003

Course Outcome No.	Course Outcome Statement
A9003.1	Apply appropriate numerical method to approximate the roots of an equation and interpolate to estimate function values at given intermediate points.
A9003.2	Compute an approximate value of a definite integral and obtain numerical solutions for first-order ordinary differential equations.
A9003.3	Construct periodic functions using Fourier series and express non-periodic functions using Fourier transforms in terms of sine and cosine.
A9003.4	Apply Cauchy-Riemann equations to test analyticity and construct harmonic functions using the Milne-Thomson method.
A9003.5	Evaluate integrals along a contour and express complex functions in power series.

Year & Semester	B.Tech II Year III Semester
Course Title	Computational Mathematics Laboratory
Course Code	A9006

Course Outcome No.	Course Outcome Statement
A9006.1	Develop the code to find the eigenvalues and eigenvectors using Python/MATLAB.
A9006.2	Develop the code to find solution of algebraic and transcendental equations using Python/MATLAB.
A9006.3	Develop the code to find solution of linear system of equations using Python/MATLAB.
A9006.4	Write the code to solve problems of first-order linear differential equations with constant coefficients.
A9006.5	Write the code to solve problems of higher order linear differential equations with constant coefficients.

Year & Semester	B.Tech I Year II Semester
Course Title	Engineering Physics
Course Code	A9007

Course Outcome No.	Course Outcome Statement
A9007.1	Apply quantum mechanical principles to understand the particle behavior and formation of energy bands in solids.
A9007.2	Analyze semiconductor properties and explain the operation of PN junction diode and their applications.
A9007.3	Apply quantum gates to design quantum circuits and implement fundamental quantum algorithms.
A9007.4	Analyze magnetic and dielectric properties relevant to modern technological applications.
A9007.5	Apply laser and fibre optic principles to communication and sensing technologies.

Year & Semester	B.Tech I Year I Semester
Course Title	Engineering Chemistry
Course Code	A9009

Course Outcome No.	Course Outcome Statement
A9009.1	Analyse the hardness and other impurities present in the water for industrial and domestic applications.
A9009.2	Apply electrochemical principles to protect the metals from corrosion.
A9009.3	Illustrate the types of energy sources along with their characteristics and applications.
A9009.4	Differentiate the properties of various polymeric materials based on their structure and engineering applications.
A9009.5	Compare the materials to study various physical and chemical properties.

Year & Semester	B.Tech I Year I Semester
Course Title	Engineering Chemistry Laboratory
Course Code	A9010

Course Outcome No.	Course Outcome Statement
A9010.1	Apply the instrumental techniques to find out the strength of solutions.
A9010.2	Analyze the impurities present in the water using volumetric analysis.
A9010.3	Make use of different titrimetric methods to measure chemical species.
A9010.4	Analyze the importance of temperature and pressure on physical properties of liquids.
A9010.5	Calculate the yield of synthesized compounds by maintaining appropriate reaction conditions.

Year & Semester	B.Tech I Year I Semester
Course Title	English for Skill Enhancement
Course Code	A9011

Course Outcome No.	Course Outcome Statement
A9011.1	Identify and use appropriate vocabulary to compose and deliver clear oral and written communication.
A9011.2	Practice adept usage of grammar for effective communication.
A9011.3	Interpret and summarize known and unknown passages.
A9011.4	Develop proficiency in writing for academic purposes.
A9011.5	Demonstrate basic proficiency in professional correspondence.

Year & Semester	B.Tech I Year I Semester
Course Title	English Language and Communication Skills Laboratory
Course Code	A9012

Course Outcome No.	Course Outcome Statement
A9012.1	Acquire the received pronunciation and speak in a neutral accent.
A9012.2	Use language effectively in real-life situations.
A9012.3	Demonstrate effective use of non verbal communication.
A9012.4	Interpret visual data for oral communication.
A9012.5	Develop the ability to enhance listening skills.

Year & Semester	B.Tech II Year III Semester
Course Title	Business Economics and Financial Analysis
Course Code	A9014

Course Outcome No.	Course Outcome Statement
A9014.1	Analyze business and economic concepts to assess their impact on the overall economic environment.
A9014.2	Examine the relationship between demand, supply, and elasticity in understanding market behavior.
A9014.3	Apply production, cost, market structure, and pricing concepts to interpret business operations and competitive strategies.
A9014.4	Apply accounting principles and rules for preparing financial statements.
A9014.5	Analyze financial statements and capital budgeting techniques to evaluate the financial health of a business.

Year & Semester	B.Tech I Year II Semester
Course Title	Community Centered Design Thinking
Course Code	A9021

Course Outcome No.	Course Outcome Statement
A9021.1	Understand the significance of community-centered design approaches.
A9021.2	Apply needs assessment techniques to identify community challenges and requirements.
A9021.3	Conduct comparative analysis of existing solutions for community challenges.
A9021.4	Integrate ethical and sustainability principles into the design process.
A9021.5	Develop and document refined problem statements and innovative ideas.

Year & Semester	B.Tech II Year III/IV Semester
Course Title	Product Design and Development
Course Code	A9022

Course Outcome No.	Course Outcome Statement
A9022.1	Identify the needs and requirements for product design through community-centered approaches.
A9022.2	Apply product design principles and methodologies for developing innovative solutions.
A9022.3	Develop prototypes and implement iterative design improvements based on feedback.
A9022.4	Apply design for manufacturability and sustainability principles in product development.
A9022.5	Demonstrate and present the product design and development process to stakeholders.

Year & Semester	B.Tech II Year III/IV Semester
Course Title	Technology Entrepreneurship
Course Code	A9023

Course Outcome No.	Course Outcome Statement
A9023.1	Identify and analyze market opportunities for community-driven technological innovations.
A9023.2	Apply intellectual property strategies for protecting product designs and innovations.
A9023.3	Develop sustainable and scalable business models for product commercialization.
A9023.4	Formulate funding, financial, and go-to-market strategies for product launch.
A9023.5	Prepare and deliver investor-ready pitches or patent documentation to relevant stakeholders.

Year & Semester	B.Tech I Year I Semester
Course Title	Electrical Circuits-I
Course Code	A9201

Course Outcome No.	Course Outcome Statement
A9201.1	Apply network theorems and circuit laws to solve electrical networks with active and passive elements.
A9201.2	Apply network theorems to simplify and analyze DC circuits.
A9201.3	Apply phasor concepts to determine impedance, power, and steady-state response in single-phase AC circuits.
A9201.4	Analyze three-phase systems to determine voltages, currents, and power in star and delta connections for balanced and unbalanced loads.
A9201.5	Apply the concepts of self and mutual inductance to determine the behavior of series and parallel coupled circuits.

Year & Semester	B.Tech I Year II Semester
Course Title	Electrical Circuits-II
Course Code	A9206

Course Outcome No.	Course Outcome Statement
A9206.1	Model and analyze the performance of two-port networks for series, parallel, and cascade connections.
A9206.2	Apply network theorems to simplify and analyze AC circuits.
A9206.3	Apply network topology techniques and resonance concepts in RLC circuits.
A9206.4	Analyze the transient response of RL, RC, and RLC circuits under DC excitation.
A9206.5	Apply Laplace transform techniques for solving RL, RC, and RLC circuits under DC excitation.

Year & Semester	B.Tech II Year III Semester
Course Title	Electrical Power Generation
Course Code	A9207

Course Outcome No.	Course Outcome Statement
A9207.1	Apply the fundamentals of thermal and nuclear power plants to explain the operation of their plant components.
A9207.2	Apply the concepts of hydro, geothermal, tidal, and wave energy systems to describe their operation, design aspects, and limitations.
A9207.3	Apply the concepts of wind and solar power generation to analyze their layouts, components, and limitations.
A9207.4	Apply biomass conversion and hydrogen production technologies to explain their utilization as renewable energy sources.
A9207.5	Apply load curve analysis and cost/tariff calculations to determine the economic performance of power stations.

Year & Semester	B.Tech II Year IV Semester
Course Title	Power System Transmission and Distribution
Course Code	A9210

Course Outcome No.	Course Outcome Statement
A9210.1	Apply power transmission fundamentals to analyze transmission line parameters and their classification.
A9210.2	Analyze the performance of transmission lines under steady-state conditions.
A9210.3	Analyze power flow and stability in interconnected power systems.
A9210.4	Apply distribution system concepts and components to determine voltage regulation and power loss.
A9210.5	Investigate the operation of protective relaying schemes for power systems.

Year & Semester	B.Tech II Year III Semester
Course Title	Electrical Machines-I
Course Code	A9211

Course Outcome No.	Course Outcome Statement
A9211.1	Apply the concepts of DC generators to determine voltage, efficiency, and performance under different loads and during parallel operation.
A9211.2	Apply the principles of DC motors to determine torque, speed regulation, and efficiency.
A9211.3	Apply testing techniques to assess the losses, efficiency, and operational behavior of DC machines.
A9211.4	Apply transformer principles to determine voltage and current relationships, phasor behavior, and efficiency under different loading conditions.
A9211.5	Use testing methods to determine transformer performance, power losses, and effectiveness of various connection schemes.

Year & Semester	B.Tech II Year III Semester
Course Title	Control Systems
Course Code	A9212

Course Outcome No.	Course Outcome Statement
A9212.1	Develop the transfer function and state space models of electro-mechanical dynamic systems.
A9212.2	Analyze time response, steady state errors and performance indices of linear time invariant control systems.
A9212.3	Apply Routh's and Nyquist stability criterion to analyze and design feedback control systems.
A9212.4	Examine the performance of feedback control system by using graphical techniques.
A9212.5	Design the various compensators and controllers for time-invariant systems.

Year & Semester	B.Tech II Year III Semester
Course Title	Electrical Machines-I Laboratory
Course Code	A9213

Course Outcome No.	Course Outcome Statement
A9213.1	Perform tests to determine the magnetization and load characteristics of DC shunt and compound generators.
A9213.2	Analyze the performance characteristics and speed control methods of various DC motors through experimental procedures.
A9213.3	Apply standard testing procedures such as Swinburne's, Hopkinson's, Field's, and brake tests to evaluate efficiency and losses of DC machines.
A9213.4	Perform open circuit, short circuit, and Sumpner's tests to evaluate the efficiency and losses of single-phase transformers.
A9213.5	Apply three phase transformer connection techniques to investigate their performance in practical scenarios.

Year & Semester	B.Tech II Year III Semester
Course Title	Control Systems Laboratory
Course Code	A9214

Course Outcome No.	Course Outcome Statement
A9214.1	Transform and interpret transfer function and state-space models to represent dynamic system behavior.
A9214.2	Analyze the performance characteristics of DC and AC servomotors and synchros through experimental methods.
A9214.3	Analyze transient response and time-domain specifications of linear time-invariant second-order control systems.
A9214.4	Examine system stability and performance of feedback control systems using graphical methods.
A9214.5	Analyze compensators and controllers through hardware and MATLAB simulations.

Year & Semester	B.Tech II Year III Semester
Course Title	PCB Design
Course Code	A9215

Course Outcome No.	Course Outcome Statement
A9215.1	Demonstrate understanding of PCB fundamentals, design flow, fabrication, and assembly processes.
A9215.2	Apply EDA tools to design schematic layouts, perform Design Rule Checks (DRC), and correct errors in PCB designs.
A9215.3	Design electronic circuits such as rectifiers, voltage regulators, relay drivers, and display drivers for PCB implementation.
A9215.4	Develop PCB layouts for both discrete-component and microcontroller-based application circuits using EDA tools.

Year & Semester	B.Tech II Year III Semester
Course Title	Analog Devices and Circuits
Course Code	A9412

Course Outcome No.	Course Outcome Statement
A9412.1	Demonstrate the operation and characteristics of diodes and bipolar transistors under various biasing conditions.
A9412.2	Make use of rectifier, filter, and regulator circuits to design DC regulated power supply.
A9412.3	Analyze single stage transistor amplifier circuits using low frequency h-parameter model.
A9412.4	Analyze the effect of feedback and oscillator circuits for given specifications.
A9412.5	Illustrate the operation and characteristics of JFET, MOSFET under various conditions.

Year & Semester	B.Tech II Year III Semester
Course Title	Analog Devices and Circuits Laboratory
Course Code	A9413

Course Outcome No.	Course Outcome Statement
A9413.1	Analyze the characteristics of diodes and transistors under various biasing conditions.
A9413.2	Design and implement amplifiers and oscillator circuits for the given specifications.
A9413.3	Build electronic circuits making use of diodes and transistors and verify the operation practically.
A9413.4	Analyze the effect of feedback in amplifiers in terms of gain and bandwidth.
A9413.5	Simulate and analyze the characteristics of FET and MOSFET devices to determine their performance parameters.

Year & Semester	B.Tech I Year I Semester
Course Title	Programming for Problem Solving
Course Code	A9501

Course Outcome No.	Course Outcome Statement
A9501.1	Use basic programming constructs and control statements to design solutions for computational problems.
A9501.2	Develop programs using arrays and strings to store and manipulate sequential data.
A9501.3	Implement modular programming using functions, structures, and unions to manage complex problems and data.
A9501.4	Make use of pointers and file handling to effectively manage and process data.
A9501.5	Choose appropriate searching and sorting technique to organize and retrieve data efficiently.

Year & Semester	B.Tech I Year I Semester
Course Title	Programming for Problem Solving Laboratory
Course Code	A9502

Course Outcome No.	Course Outcome Statement
A9502.1	Make use of fundamental programming constructs to develop solutions for computational problems.
A9502.2	Perform various operations on arrays and strings to effectively organize, process, and manipulate sequential data in programs.
A9502.3	Develop programs with functions and structures to design modular programs that efficiently handle and process data.
A9502.4	Apply pointers and file handling techniques to implement programs for storing and managing data effectively.
A9502.5	Implement searching and sorting algorithms to efficiently organize and access data.

Year & Semester	B.Tech I Year II Semester
Course Title	Data Structures
Course Code	A9503

Course Outcome No.	Course Outcome Statement
A9503.1	Make use of programming constructs, templates and STL components to implement data structures and solve computational problems effectively.
A9503.2	Implement linked list data structures using abstract data types to perform various operations.
A9503.3	Implement stack and queue abstract data types for solving applications on linear data.
A9503.4	Choose an appropriate nonlinear data structure for representing and solving real world problems.
A9503.5	Examine hashing and dictionary structures for insertion, deletion, and searching in computational problems.