

GEMS POLYTECHNIC COLLEGE

(Approved by AICTE, Govt. of India, F. No Northern/2015/1-2474317051)
NH-2, Jogiya More, Ratanpura, Aurangabad, Bihar– 824121

Department of Electrical and Electronics Engineering Subject Wise Course Outcomes

The Students will be able to

Course Name	Basic Engineering Mathematics	Course Year	2025-2026	Semester	1
CO 101.1	Solve engineering-related problems based on applications of algebra				
CO 101.2	Use the concept of derivative as a tool to solve engineering-related problems				
CO 101.3	Solve branch-specific problems using differential calculus.				
CO 101.4	Use the concept of Coordinate geometry to solve branch-specific engineering-related problems				
CO 101.5	Use probability and statistics as a toolkit to solve complex engineering problems				

Course Name	Applied Physics-B	Course Year	2025-2026	Semester	1
CO102.1	Estimate the errors in measurements of physical quantity with precision.				
CO102.2	Apply the concept of waves for various engineering applications involving wave dynamics.				
CO102.3	Apply the concepts of electromagnetics in engineering applications.				
CO102.4	Use semiconductor devices for various electronics related applications.				
CO102.5	Apply the basic concepts of modern physics for solving engineering problems.				

Course Name	Applied Chemistry-B	Course Year	2025-2026	Semester	1
CO103.1	Solve various engineering problems applying the basic concepts of atomic structure, chemical bonding, and solutions.				
CO103.2	Use relevant water treatment techniques to solve domestic and industrial problems.				
CO103.3	Solve engineering problems using concepts of engineering materials and properties.				
CO103.4	Use relevant fuels and lubricants for domestic and industrial applications.				
CO103.5	Solve engineering problems using the concepts of electrochemistry and corrosion.				

Course Name	Engg. Mechanics	Course Year	2025-2026	Semester	1
CO104.1	Compute the force to solve the problems.				
CO104.2	Analyse various analytical and graphical conditions required for equilibrium of engineering systems.				
CO104.3	Apply the principles of friction in various conditions to solve problems.				
CO104.4	Calculate centroid, center of gravity and moment of Inertia of different geometrical shapes.				
CO104.5	Select the relevant lifting machine(s) for the given purposes.				

Course Name	Engg. Drawing & Graphics	Course Year	2025-2026	Semester	1
CO105.1	Construct a drawing scale by using drawing components and explain the Indian standards of engineering drawing				
CO105.2	Construct multi-view orthographic projections of objects by visualizing them in different positions				
CO105.3	Construct pictorial drawings using the principles of isometric and perspective projections to visualize objects in three dimensions.				
CO105.4	Show freehand sketching to aid in the visualization process and to efficiently communicate ideas graphically				
CO105.5	Make use of basic AUTOCAD commands tools for how to draw modify and edit basic shapes(2D)				

Course Name	Electrical & Electronics Workshop	Course Year	2025-2026	Semester	1
CO106.1	Identify different active and passive components, measuring instruments, and semiconductor devices used in electrical workshops.				
CO106.2	Demonstrate the use of a multimeter and clip-on meter to measure resistance, voltage, and current in electrical circuits.				
CO106.3	Perform soldering of electronic components on a PCB and continuity testing using a multimeter.				
CO106.4	Demonstrate basic safety procedures, including artificial respiration, first aid for electrical hazards, and fire extinguisher use.				
CO106.5	Construct simple electrical joints and sheet metal work using appropriate tools and techniques.				

Course Name	Environmental Education and Sustainable Development	Course Year	2025-2026	Semester	1
CO107.1	Explain the importance of ecosystem for the protection of environment				
CO107.2	Use relevant air & water pollution control methods to solve pollution related issues				
CO107.3	Recognize relevant energy sources required for domestic & industrial application				
CO107.4	Analyze the issues of climate change and its impact on sustainability				
CO107.5	Apply engineering solutions/methods/legislations to reduce the activities that are harming the environment.				

Course Name	Basic Electronics Engineering	Course Year	2025-2026	Semester	2
CO108.1	Apply the concept of semiconductor physics to electronic circuits				
CO 108.2	Use a PN junction diode in any given electronic circuit.				
CO 108.3	Use zener diode as voltage regulators and protection devices.				
CO 108.4	Build rectifier circuits comprising diodes.				
CO 108.5	Use special types of diodes in different electronic circuits.				
CO 108.6	Use BJT operation and use it as an amplifier in electronic circuits. 				

Course Name	Electric Circuits and Machines	Course Year	2025-2026	Semester	2
CO 109.1	Apply basic laws to simplify the electrical circuits and networks.				
CO 109.2	Apply principles of network theorems to determine various parameters in a given electrical circuit and networks				
CO 109.3	Apply the concepts of transient and steady state response to various electrical circuits.				
CO 109.4	Use two port networks to determine the circuit parameters				
CO 109.5	Use basic electrical machines for the industrial applications.				

Course Name	Communication Skills (English)	Course Year	2025-2026	Semester	2
CO 110.1	Communicate contextually in different situations.				
CO 110.2	Use Verbal Communication effectively				
CO 110.3	Deploy Non-Verbal Communication contextually.				
CO 110.4	Write various texts using vocabulary and correct grammar.				
CO 110.5	Draft effective business correspondence with brevity and clarity.				

Course Name	Applied Mathematics -C	Course Year	2025-2026	Semester	2
CO 111.1	 Demonstrate the ability to solve engineering-related problems based on applications of integration.				
CO 111.2	Use differential equations as a tool to solve problems related to electrical and electronic engineering.				
CO 111.3	Select a suitable method to solve nonlinear equations based on engineering applications.				
CO 111.4	Use Laplace transforms to solve given differential equations based on engineering applications.				
CO 111.5	Apply Fourier series and Fourier transform to solve broad-based electrical and electronic engineering-related problems.				

Course Name	Fundamentals of IT and C programming	Course Year	2025-2026	Semester	2
CO112.1	Appraise computer systems and its applications for various educational, business, and industrial domain.				
CO112.2	Setup a small computer Network.				
CO112.3	Write 'C' Program to solve given arithmetic expression				
CO112.4	Develop 'C' program Using control structure				
CO112.5	Develop 'C' programs using arrays.				

Course Name	Professional Ethics	Course Year	2025-2026	Semester	2
CO 113.1	 Demonstrate good values and ethics in the day to day activities and at workplace				
CO 113.1	 Identify a set of values and ethics related to fair professional practice. 				

Course Name	Sports, Yoga and Meditation	Course Year	2025-2026	Semester	2
CO 114.1	Select appropriate physical activities to maintain healthy lifestyle. 				
CO 114.2	Apply basic principles and practices of Yoga and meditation for overall growth & development.				
CO 114.3	Use fitness and wellness techniques for optimal health and wellbeing				
CO 114.4	Apply ancient Indian ayurvedic methods and techniques, exercises, yoga and meditation for fitness and wellness.				

Course Name	Electrical Circuit and Networks	Course Year	2025-2026	Semester	3
CO 201.1	Apply basic electrical laws and analysis techniques to simplify and solve electrical circuits.				
CO 201.2	Use network theorems to analyze and solve electrical circuit problems.				
CO 201.3	Measure electrical quantities in single-phase AC circuits using appropriate instruments.				
CO 201.4	Determine the resonance condition in series and parallel RLC circuits and measure two-port network parameters.				
CO 201.5	Measure power and power factor in three-phase AC circuits.				

Course Name	Electrical Measurements and Instrumentation	Course Year	2025-2026	Semester	3
CO 202.1	Interpret the basic concepts of measurement and instrumentation for measuring instruments.				
CO 202.2	Measure current and voltage in an electrical system.				
CO 202.3	Measure power and energy in single and three phase systems.				
CO 202.4	Measure resistance, inductance, and capacitance using bridges, meters				
CO 202.5	Use various instruments meters for measuring electrical parameters such as power factor, Phase sequence, and circuit components.				

Course Name	DC Machines and Transformers	Course Year	2025-2026	Semester	3
CO 203.1	Describe the construction and working of DC generators and demonstrate their performance under load conditions.				
CO 203.2	Explain the working and characteristics of DC motors and demonstrate speed control and starting methods under load.				
CO 203.3	Describe the construction and working of single-phase transformers and perform relevant tests to determine efficiency and regulation.				
CO 203.4	Explain the construction and connections of 3-phase transformers and demonstrate their parallel operation under different conditions.				
CO 203.5	Identify different special transformers and describe their construction, working, and applications.				

Course Name	Electrical Power Generation Transmission and Distribution	Course Year	2025-2026	Semester	3
CO 204.1	Describe the basic components and operational principles of thermal, hydro, nuclear, and gas-based power plants				
CO 204.2	Classify types of renewable energy-based power systems and describe their key operational features.				
CO 204.3	Explain the layout and key elements of the electrical power transmission system.				
CO 204.4	Discuss the operation and major components of the electrical power distribution system.				
CO 204.5	Interpret the basic concepts of restructuring and the structure of Deregulated Power Systems.				

Course Name	Python Programming	Course Year	2025-2026	Semester	3
CO205.1	Use various data types and operators in formation of expressions.				
CO205.2	Write and execute programs using control statements				
CO205.3	Perform relevant operations on Sequence data types				
CO205.4	Create functions in modules				

CO205.5	Interpret the basic concepts of restructuring and the structure of Deregulated Power Systems.
CO205.6	Handle data files and exceptions.

Course Name	Summer Internship-I	Course Year	2025-2026	Semester	3
CO 206.1	Explain the practical things about electrical equipments.				
CO 206.2	Identify the different types of electrical equipments				
CO 206.3	Explain the functioning of any electrical equipments				

Course Name	Power Electronics	Course Year	2025-2026	Semester	4
CO 207.1	Test the performance of Power Electronics devices.				
CO 207.2	Maintain Turn on and Turn off circuit for a thyristor. 				
CO 207.3	Use relevant Phase Controlled rectifier for a given situations.				
CO 207.4	Select a suitable chopper for a given applications. 				
CO 207.5	Test the performance of inverter, Cycloconverter and AC voltage controller.				

Course Name	Microprocessor and Microcontrollers	Course Year	2025-2026	Semester	4
CO 208.1	Analyze the architecture of Microprocessor IC 8085. 				
CO 208.2	Develop the assembly language programs for various operations using instruction set of 8085 Microprocessor				
CO 208.3	Interface the memory and I/O devices to 8085 Microprocessor.				
CO 208.4	Analyze the architecture of Microcontroller IC 8051. 				
CO 208.5	Develop the assembly language programs for various operations using instruction set of 8051 Microcontroller.				

Course Name	A C Machines	Course Year	2025-2026	Semester	4
CO1 209.1	Maintain three phase Induction Motor.				
CO2 209.2	Use relevant Single-phase Induction Motors for various applications.				
CO3 209.3	Synchronize an alternator with bus bar/another alternator.				
CO4 209.4	Use synchronous motors for industrial applications.				
CO5 209.5	Use special electrical machines for different applications.				

Course Name	Control System and PLC	Course Year	2025-2026	Semester	4
CO1 210.1	Apply the basics of control system to a given system.				
CO2 210.2	Analyze time response of the first and second order control systems.				
CO3 210.3	Determine the stability of a given control system using Routh-Hurwitz and Bode plot methods				
CO4 210.4	Use PID Controller to initiate control action in a given control system. 				
CO5 210.5	Use PLC to control the simple industrial processes. 				

Course Name	Electrical Software Lab	Course Year	2025-2026	Semester	4
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CO1 211.1	Identify and use standard symbols and codes to represent electrical and electronic components.
CO2 211.2	Draw simple 2D views of electrical components using AutoCAD software.
CO3 211.3	Perform basic arithmetic operations and generate simple plots using MATLAB.
CO4 211.4	Observe and explain the results of electrical and electronic circuits developed using MATLAB.
CO5 211.5	Observe and explain the simulated models of electrical and electronic circuits using Simulink.

Course Name	Indian Constitution	Course Year	2025-2026	Semester	4
CO213.1	List salient features and characteristics of the constitution of India. 				
CO213.2	Follow fundamental rights and duties as responsible citizen and engineer of the country.				
CO213.3	Analyze major constitutional amendments in the constitution.				

Course Name	Essence of Indian Knowledge System and Tradition	Course Year	2025-2026	Semester	4
CO214.1	Identify the rich heritage and legacy residing in our Indian Knowledge systems.				
CO214.2	Correlate the technological & philosophical concepts of IKS with engineering domain specific problems and local problems for finding out possible solutions.				

Course Name	Microprocessor & Microcontroller	Course Year	2025-2026	Semester	5
CO 301.1	Understand the architecture and basic programming of the 8085 microprocessor.				
CO 301.2	Explain the basic concepts and applications of microcontrollers				
CO 301.3	Understand the architecture and main components of the 8051 microcontroller.				
CO 301.4	Identify and utilize the instruction set of the 8051 microcontroller.				
CO 301.5	Utilize the internal peripherals of the 8051 microcontroller to develop related programs.				

Course Name	Energy Conservation and Audit	Course Year	2025-2026	Semester	5
CO 302.1	Interpret energy conservation policies in India.				
CO 302.2	Implement energy conservation techniques in electrical machines.				
CO 302.3	Explain energy conservation techniques in electrical installations.				
CO 302.4	Explain Co-generation and relevant tariff for reducing losses.				
CO 302.5	Explain energy audit for electrical system.				

Course Name	Switchgear and Protection	Course Year	2025-2026	Semester	5
CO 303C.1	Identifies various types of faults in the power system.				
CO 303C.2	Select suitable switchgears for different applications.				
CO 303C.3	Explain the performance of different protective relays.				
CO 303C.4	Explain protection systems of alternators and transformers.				
CO 303C.5	Explain protection schemes for motors and transmission lines.				

Course Name	Electric Traction	Course Year	2025-2026	Semester	5
CO 304.1	Interpret the traction layout and its systems				
CO 304.2	Maintain the power supply arrangements.				
CO 304.3	Maintain the function of the overhead equipment for electric traction				
CO 304.4	Maintain the different components of the electric locomotive.				
CO 304.5	Maintain the traction motor and train lighting system				
CO 304.6	Maintain the signalling and supervisory control systems.				

Course Name	Soft Computing Techniques	Course Year	2025-2026	Semester	5
CO 305.1	Describe different types of problem solving methods and tools in soft computing				
CO 305.2	Illustrate the evolution about the computing Methods				
CO 305.3	Explain Swarm Optimization in detail.				
CO 305.4	Describe different types soft computing tools.				
CO 305.5	Explain the Applications of Soft Computing.				

Course Name	2 Microcontroller Applications Laboratory	Course Year	2025-2026	Semester	5
CO306.1	Interpret the salient features of various types of microcontrollers.				
CO306.2	Interpret the salient features of architype of types microcontrollers IC8051				
CO306.3	Maintain the program features of the Microcontroller based application				
CO306.4	Generate assembly language program				
CO306.5	Construct the program to interface 8051 microcontrollers with LED/SWITCH				

Course Name	Energy Conservation and Audit 2020507	Course Year	2025-2026	Semester	5
CO 307.1	Interpret energy conservation policies in India.				
CO 307.2	Implement energy conservation techniques in electrical machines.				
CO 307.3	Explain energy conservation techniques in electrical installations.				
CO 307.4	Explain Co-generation and relevant tariff for reducing losses.				
CO 307.5	Explain energy audit for electrical system.				

Course Name	2 Switchgear and Protection Laboratory	Course Year	2025-2026	Semester	5
CO 308C.1	Select suitable switchgears for different applications.				
CO 308C.2	Test the performance of different protective relays.				
CO 308C.3	Maintain protection systems of alternators and transformers.				
CO 308C.4	Maintain protection schemes for motors and transmission lines.				

Course Name	2 Electric Traction Lab.	Course Year	2025-2026	Semester	5
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CO 309.1	Interpret the traction layout and its systems
CO 309.2	Maintain the power supply arrangements.
CO 309.3	Maintain the function of the overhead equipment for electric traction
CO 309.4	Maintain the different components of the electric locomotive.
CO 309.5	Maintain the traction motor and train lighting system
CO 309.6	Maintain the signalling and supervisory control systems.

Course Name	Minor Project	Course Year	2025-2026	Semester	5
C310.1	Analyse and identify the problem and technology to be adopted				
C310.2	Function as a team in the planning and execution of the project work				
C310.3	Apply appropriate knowledge of engineering to achieve identified objectives of the project				
C310.4	Create a demonstrable output				

Course Name	Minor Project	Course Year	2025-2026	Semester	5
CO311.1	To develop new skills or improve existing ones related to the subject matter or topic through an online Platform.				
CO311.2	To learn at their own pace and on their own schedule, making it easier to fit education into their busy lives.				
CO311.3	To build effective peer-to-peer learning and online mentoring				
CO311.4	To connect students from all over the world, providing opportunities to learn from and collaborate with people from diverse backgrounds and cultures.				

Course Name	Entrepreneurship and Start-Ups	Course Year	2025-2026	Semester	6
CO 312.1	Explain the dynamic role of entrepreneurship and small businesses.				
CO 312.2	Develop a business plan by visualizing the business of discovered ideas				
CO 312.3	Make use of strategic marketing planning				
CO 312.4	Organize and manage small business				
CO 312.5	Plan the financial strategy and control.				

Course Name	Building Electrification	Course Year	2025-2026	Semester	6
CO 313.1	List the different types of tools, wires, cables and accessories for electrification.				
CO 313.2	Describe different types of wiring methods and layouts.				
CO 313.3	Design electrical wiring system for given residential unit.				
CO 313.4	Explain different types of protective equipment's and earthing used in electrical installation.				
CO 313.5	Choose proper illumination scheme for residential unit.				

Course Name	Utilization of Electrical Energy	Course Year	2025-2026	Semester	6
CO 314.1	Explain the important terms of illumination and lighting system.				
CO 314.2	Describe the process of electric heating and welding.				
CO 314.3	Interpret the optimized working of elevators.				

CO 314.4	Explain the importance and uses of electric drives.
CO 314.5	Describe the economics operation of utilizing electrical energy

Course Name	Network Theory	Course Year	2025-2026	Semester	6
CO 315.1	Describe the Circuit Elements & Solve the circuits using by Network Techniques.				
CO 315.2	Use the mathematical tools to solve the problems in Fourier's & Laplace Transforms				
CO 315.3	Compare & Solve the RLC elements using resonance circuits				
CO 315.4	Solve the given network using by Two port Networks				
CO 315.5	Explain the principles of passive network synthesis				
CO 315.6	Explain the concepts of first order system & second order systems				

Course Name	Network Theory	Course Year	2025-2026	Semester	6
CO316.1	Explain the importance of projects its priorities and lifecycle.				
CO316.2	Identify projects from marketing, operational and financial perspectives.				
CO316.3	Describe the essential features of the financial estimates and capital requirements.				
CO316.4	Explain projects based on discounting and non- discounting methods.				
CO316.15	Determine network planning and use of Critical Path Method (CPM) and PERT.				

Course Name	Building Electrification Laboratory	Course Year	2025-2026	Semester	6
CO 317.1	List the different types of tools, wires, cables and accessories for electrification.				
CO 317.2	Prepare a series testing board, Godown wiring and One lamp controlled by two switch.				
CO 317.3	Prepare wiring installation on board showing one lamp, one fan and one socket with PVC surface conduit.				
CO 317.4	Design residential installation scheme and estimate the material required.				
CO 317.5	Test wiring installation using megger.				

Course Name	Building Electrification Laboratory	Course Year	2025-2026	Semester	6
CO 318.1	Generate motivation for diverse topics and formulate a structured approach for technical presentations.				
CO 318.2	Systematically conduct a comprehensive literature review and compile technical documentation based on scholarly publications.				
CO 318.3	Examine and interpret the proof-of-concept results and their associated data.				
CO 318.4	Enhance presentation skills and refine interpersonal abilities for effective communication.				
CO 318.5	Utilize contemporary technologies for crafting technical reports.				

Course Name	Building Electrification Laboratory	Course Year	2025-2026	Semester	6
CO319.1	Identify and define the problem and technology to be adopted				
CO319.2	Function as a team in the planning and execution of the project work				
CO319.3	Apply appropriate knowledge of engineering to achieve identified objectives of the project				
CO319.4	Fabricate a demonstrable output				

Course Name	Building Electrification Laboratory	Course Year	2025-2026	Semester	6
CO320.1	To develop new skills or improve existing ones related to the subject matter or topic through an online Platform.				
CO320.2	To learn at their own pace and on their own schedule, making it easier to fit education into their busy lives.				
CO320.3	To build effective peer-to-peer learning and online mentoring				
CO320.4	To connect students from all over the world, providing opportunities to learn from and collaborate with people from diverse backgrounds and cultures.				