



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 Engineering

Course Outcomes Statement for All Courses of the Academic Year 2025–2026

The students will be able to

S.No	CO ID.	Course name: Basic Engg Mathematics 2400101	Course year: 2025-2026	Semester: 01	Credits: 4
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			

CO ID.	Course name: Applied Physics-B 2400102B	Course year: 2025-2026	Semester: 01	Credits: 6
2	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.		

CO ID.	Course name: Basic Electrical Engineering 2420104	Course year: 2025-2026	Semester: 01	Credits: 6
3	CO103.1	Apply basics of charge, current, voltage, resistors, and effects in DC/AC circuits		
	CO103.2	Measure capacitors, inductors, power factor, and study their applications		
	CO103.3	Apply the fundamental Laws and concepts of DC and AC circuits		
	CO103.4	Explain magnetic circuits, hysteresis, and B-H curve; analyze series/parallel circuits; compare with electric circuits.		
	CO103.5	Understand electromagnetic induction and its laws, rules, and effects		

CO ID.	Course name: Engg. Drawing & Graphics (2415105)	Course year: 2025-2026	Semester: 01	Credits: 3
4	CO104.1	Construct a drawing scale by using drawing components and explain the Indian standards of engineering drawing		
	CO104.2	Construct multi-view orthographic projections of objects by visualizing them in different positions		
	CO104.3	Construct pictorial drawings using the principles of isometric and perspective projections to visualize objects in three dimensions.		
	CO104.4	Show freehand sketching to aid in the visualization process and to efficiently communicate ideas graphically		
	CO104.5	Make use of basic AUTOCAD commands tools for how to draw modify and edit basic shapes(2D)		

CO ID.	Course name: Fundamentals of IT and C Programming (2418105)	Course year: 2025-2026	Semester: 01	Credits: 6
5	CO105.1	Appraise computer systems and its applications for various educational, business, and industrial domain.		
	CO105.2	Setup a small computer Network.		
	CO105.3	Write 'C' Program to solve given arithmetic expression		
	CO105.4	Develop 'C' program Using control structure		
	CO105.5	Develop 'C' programs using arrays and function.		

CO ID.	Course name: Electrical & Electronics Workshop (2420105)	Course year: 2025-2026	Semester: 01	Credits: 3
6	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.		

CO ID.	Course name: Electrical & Electronics Workshop (2420105)	Course year: 2025-2026	Semester: 01	Credits: 1
7	CO107.1	Practice Physical activities and Hatha Yoga focusing on Yoga for strength, flexibility, and relaxation		
	CO107.2	Describe the techniques for increasing concentration and decreasing anxiety which leads to stronger academic performance.		
	CO107.3	Explain the basic skills associated with yoga and physical activities including strength and flexibility, balance and coordination		
	CO107.4	Describe the health-related fitness components; cardiorespiratory endurance, flexibility and body composition etc.		
	CO107.5	Understand electromagnetic induction and its laws, rules, and effects		

CO ID.	Course name: Open Educational Resources 2400009	Course year: 2025-2026	Semester: 01	Credits: 1
8	CO108.1	Use Open Educational Resources (OER) after their evaluation		
	CO108.2	Use copyright material appropriately		
	CO108.3	Implement suitable Creative Common License.		

	CO ID.	Course name: 2421102 Fundamentals of Electronics Egg.	Course year: 2025-2026	Semester: 02	Credits: 6
9	CO109.1	Use diode for rectification and voltage regulation.			
	CO109.2	Test the functionality of electronic circuit having transistor as a component.			
	CO109.3	Minimize the Boolean expressions and implement it using logic gates.			
	CO109.4	Understand simple combinational and sequential circuits.			
	CO109.5	Describe data converters and memory in digital electronic systems.			

	CO ID.	Course name: 2400103B Applied Chemistry-B	Course year: 2025-2026	Semester: 02	Credits: 6
10	CO110.1	Solve various engineering problems applying the basic concepts of atomic structure, chemical bonding, and solutions.			
	CO110.2	Use relevant water treatment techniques to solve domestic and industrial problems.			
	CO110.3	Solve engineering problems using concepts of engineering materials and properties.			
	CO110.4	Use relevant fuels and lubricants for domestic and industrial applications.			
	CO110.5	Solve engineering problems using the concepts of electrochemistry and corrosion.			

	CO ID.	Course name: 2400104 Communication Skills in English	Course year: 2025-2026	Semester: 02	Credits: 6
11	CO111.1	Communicate contextually in different situations.			
	CO111.2	Use Verbal Communication effectively			
	CO111.3	Deploy Non-Verbal Communication contextually.			
	CO111.4	Write various texts using vocabulary and correct grammar.			
	CO111.5	Draft effective business correspondence with brevity and clarity.			

	CO ID.	Course name: 2425104 Egg. Mechanics	Course year: 2025-2026	Semester: 02	Credits: 6
12	CO112.1	Compute the force to solve the problems.			
	CO112.2	Analyze various analytical and graphical conditions required for equilibrium of engineering systems.			
	CO112.3	Apply the principles of friction in various conditions to solve problems.			
	CO112.4	Calculate centroid, center of gravity and moment of Inertia of different geometrical shapes.			
	CO112.5	Select the relevant lifting machine(s) for the given purposes.			

	CO ID.	Course name: 2400105C Applied Mathematics-C	Course year: 2025-2026	Semester: 02	Credits: 4
13	CO 113.1	Demonstrate the ability to solve engineering-related problems based on applications of integration.			
	CO 113.2	Use differential equations as a tool to solve problems related to electrical and electronic engineering.			
	CO 113.3	Select a suitable method to solve nonlinear equations based on engineering applications.			
	CO 113.4	Use Laplace transforms to solve given differential equations based on engineering applications.			
	CO 113.5	Apply Fourier series and Fourier transform to solve broad-based electrical and electronic engineering-related problems.			

	CO ID.	Course name: 2400006 Environmental Education and sustainable development	Course year: 2025-2026	Semester: 02	Credits: 4
14	CO114.1	Use relevant air & water pollution control methods to solve pollution related issues			
	CO 114.2	Explain the importance of ecosystem for the protection of environment			
	CO114.2	Recognize relevant energy sources required for domestic & industrial application			
	CO 114.4	Analyze the issues of climate change and its impact on sustainability			
	CO114.5	Apply engineering solutions/methods/legislations to reduce the activities that are harming the environment.			

	CO ID.	Course name: Electrical Circuit and Networks (2420301)	Course year: 2025-2026	Semester: 03	Credits: 6
15	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.			

	CO ID.	Course name: Electrical Measurements and Instrumentation (2420302)	Course year: 2025-2026	Semester: 03	Credits: 6
16	CO 202.2	Measure current and voltage in an electrical system.			
	CO 202.1	Interpret the basic concepts of measurement and instrumentation for measuring instruments.			
	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.			

	CO ID.	Course name: DC Machines and Transformers (2420303)	Course year: 2025-2026	Semester: 03	Credits: 6
17	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.			

	CO ID.	Course name: Electrical Power generation Transmission and Distribution (2420304)	Course year: 2025-2026	Semester: 03	Credits: 4
18	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.			

	CO ID.	Course name: Python Programming (2418305)	Course year: 2025-2026	Semester: 03	Credits: 6
19	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	Use numpy in writing python programs			
	CO205.6	Handle data files and exceptions.			

	CO ID.	Course name: Summer Intership-1 (2420306)	Course year: 2025-2026	Semester: 03	Credits: 2
20	CO 206.1	Explain the practical things about electrical equipment's.			
	CO 206.2	Identify the different types of electrical equipment's			
	CO 206.3	Explain the functioning of any electrical equipment's			

	CO ID.	Course name: 2420401 Power Electronics	Course year: 2025-2026	Semester: 04	Credits: 6
21	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.			

	CO ID.	Course name: 2420402 Microprocessor and Microcontrollers	Course year: 2025-2026	Semester: 04	Credits: 6
22	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.			

	CO ID.	Course name: 2420403 AC Machines	Course year: 2025-2026	Semester: 04	Credits: 6
23	CO 209.1	Maintain three phase Induction Motor.			
	CO 209.2	Use relevant Single-phase Induction Motors for various applications.			
	CO 209.3	Synchronize an alternator with bus bar/another alternator.			
	CO 209.4	Use synchronous motors for industrial applications.			
	CO 209.5	Use special electrical machines for different applications.			

	CO ID.	Course name: 2420404 Control System and PLC	Course year: 2025-2026	Semester: 04	Credits: 6
24	CO210.1	Apply the basics of control system to a given system			
	CO210.2	Analyze time response of the first and second order control systems			
	CO210.3	Determine the stability of a given control system using Routh-Hurwitz and Bode plot methods.			
	CO210.4	Use PID Controller to initiate control action in a given control system.			
	CO210.5	Use PLC to control the simple industrial processes.			

	CO ID.	Course name: 2420405 Electrical Software Lab	Course year: 2025-2026	Semester: 04	Credits: 3
25	CO211.1	Identify and use standard symbols and codes to represent electrical and electronic components.			
	CO211.2	Draw simple 2D views of electrical components using AutoCAD software.			
	CO211.3	Perform basic arithmetic operations and generate simple plots using MATLAB.			
	CO211.4	Observe and explain the results of electrical and electronic circuits developed using MATLAB.			
	CO211.5	Observe and explain the simulated models of electrical and electronic circuits using Simulink.			

	CO ID.	Course name: 2400107 Professional Ethics	Course year: 2025-2026	Semester: 04	Credits: 1
26	CO212.1	Demonstrate good values and ethics in the day to day activities and at workplace.			
	CO212.2	Identify a set of values and ethics related to fair professional practice.			

	CO ID.	Course name: 2400207 Indian Constitution	Course year: 2025-2026	Semester: 04	Credits: 1
27	CO 213.1	List salient features and characteristics of the constitution of India			
	CO 213.2	Follow fundamental rights and duties as responsible citizen and engineer of the country.			
	CO 213.3	Analyze major constitutional amendments in the constitution.			
	CO ID.	Course name: 2400108 Essence of Indian Knowledge System and Tradition	Course year: 2025-2026	Semester: 04	Credits: 1
28	CO 214.1	Identify the rich heritage and legacy residing in our Indian Knowledge systems.			
	CO 214.2	Correlate the technological & philosophical concepts of IKS with engineering domain specific problems and local problems for finding out possible solutions.			
	CO ID.	Course name: 2020501 Microprocessor & Microcontroller	Course year: 2025-2026	Semester: 05	Credits: 4
29	CO 301.1	Interpret the salient features of microprocessor 8085			
	CO 301.2	Interpret the salient features of archetype of types microcontrollers IC8051			
	CO 301.3	Maintain the program features of the Microcontroller based application			
	CO 301.4	Develop assembly language program			
	CO 301.5	Develop programs to interface 8051 microcontrollers with LED/SWITCH			
	CO ID.	Course name: 2020502 Energy Conservation and Audit	Course year: 2025-2026	Semester: 05	Credits: 3
30	CO 302.1	Interpret energy conservation policies in India.			
	CO 302.2	Implement energy conservation techniques in electrical machines.			
	CO 302.3	Apply energy conservation techniques in electrical installations.			
	CO 302.4	Use Co-generation and relevant tariff for reducing losses.			
	CO 302.5	Undertake energy audit for electrical system.			
	CO ID.	Course name: 2020503C Switchgear and Protection	Course year: 2025-2026	Semester: 05	Credits: 3
31	CO 303C.1	Identifies various types of faults in the power system.			
	CO 303C.2	Select suitable switchgears for different applications.			
	CO 303C.3	Test the performance of different protective relays.			
	CO 303C.4	Maintain protection systems of alternators and transformers.			
	CO 303C.5	Maintain protection schemes for motors and transmission lines.			
	CO 303C.6	Maintain protection schemes for power system against over voltages			
	CO ID.	Course name: 2020504C Electric Traction	Course year: 2025-2026	Semester: 05	Credits: 3
32	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 signaling and supervisory control systems.			
	CO ID.	Course name: 2020505A Soft Computing Techniques	Course year: 2025-2026	Semester: 05	Credits: 2
33	CO 305.1	Apply soft computing techniques for design, control and optimization of Manufacturing systems.			
	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.			
	CO ID.	Course name: 2020506 Microcontroller Applications Laboratory	Course year: 2025-2026	Semester: 05	Credits: 2
34	CO 301.11	Interpret the salient features of microprocessor 8090			
	CO 301.12	Interpret the salient features of archetype of types microcontrollers IC8056			
	CO 301.8	Maintain the program features of the Microcontroller based application			
	CO 301.14	Develop assembly language program			
	CO 301.15	Develop programs to interface 8051 microcontrollers with LED/SWITCH			
	CO ID.	Course name: 2020507 Energy Conservation and Audit Laboratory	Course year: 2025-2026	Semester: 05	Credits: 1
35	CO 307.1	Interpret energy conservation policies in India			
	CO 307.2	Implement energy conservation techniques in electrical machines.			
	CO 307.3	Apply energy conservation techniques in electrical installations.			
	CO 307.4	Use Co-generation and relevant tariff for reducing losses in facilities			

	CO ID.	Course name: 2020508C Switchgear and Protection Laboratory	Course year: 2025-2026	Semester : 05	Credits: 2
36	CO 308C.2	Select suitable switchgears for different applications.			
	CO 308C.3	Test the performance of different protective relays.			
	CO 308C.1	Identifies various types of faults in the power system.			
	CO 308C.4	Maintain protection systems of alternators and transformers.			
	CO 308C.5	Maintain protection schemes for motors and transmission lines.			

	CO ID.	Course name: 2020509C Electric Traction Laboratory	Course year: 2025-2026	Semester : 05	Credits: 1
37	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.			

	CO ID.	Course name: 2020510 Course Under MOOCs/ SWYAM/ NPTEL (TW)	Course year: 2025-2026	Semester : 05	Credits: 1
38	CO310.1	To develop new skills or improve existing ones related to the subject matter or topic through an online Platform.			
	CO310.2	To learn at their own pace and on their own schedule, making it easier to fit education into their busy lives.			
	CO310.3	To build effective peer-to-peer learning and online mentoring			
	CO310.4	To connect students from all over the world, providing opportunities to learn from and collaborate with people from diverse backgrounds and cultures.			

	CO ID.	Course name: 2020511 Minor Project (TW)	Course year: 2025-2026	Semester : 05	Credits: 2
39	CO311.1	Analyse and identify the problem and technology to be adopted			
	CO311.2	Function as a team in the planning and execution of the Minor project work			
	CO311.3	Apply appropriate knowledge of engineering to achieve identified objectives of the Minor project			
	CO311.4	Create a demonstrable output			

	CO ID.	Course name: 2000601 - Entrepreneurship and Start ups	Course year: 2025-2026	Semester : 06	Credits: 3
40	CO 312.1	To Understand the dynamic role of entrepreneurship and small businesses			
	CO 312.2	Organize and Manage a Small Business			
	CO 312.3	Plan the Financial strategy and Control			
	CO 312.4	Make Strategic Marketing Planning			
	CO 312.5	Conceive business Plan : To acquire entrepreneurial quality, competency, and motivation.			
	CO 312.6	To learn the process and skills of creation and management of entrepreneurial venture.			

	CO ID.	Course name: 2020602 - Building Electrification	Course year: 2025-2026	Semester : 06	Credits: 4
41	CO 313 1	Select accessories, wires, cables, and wiring systems for electrification			
	CO 313 2	Design electrical wiring installation system for residential unit.			
	CO 313 3	Design proper illumination scheme for residential unit.			
	CO 313 4	Prepare wiring layouts on wiring board. 			
	CO 313 5	Locate and diagnose faults in electrical wiring installation.			
	CO 313 6	Do proper earthing for building electrification.			

	CO ID.	Course name: Utilization of Electrical Energy 2020603	Course year: 2025-2026	Semester : 06	Credits: 4
42	CO 314.1	Understand the fundamental principles of illumination, including the definitions of terms used in illumination, laws governing illumination, and various sources of light.			
	CO 314.2	Demonstrate knowledge of different methods of electric heating and welding, including their advantages, modes of heat transfer, and applications in industrial processes.			
	CO 314.3	Comprehend the functioning and design considerations of elevators, including types of elevators, elevator car design, speed considerations, and safety regulations.			
	CO 314.4	Use the principles and factors governing the selection of electric drives, including the nature of electric supply, types of drives, load characteristics, and motor selection criteria.			
	CO 314.5	Determine the economic aspects of utilizing electrical energy, including costing, formulation of tariffs, power factor improvement, and energy conservation measures in different applications.			

	CO ID.	Course name: 2020604A - Network Theory	Course year: 2025-2026	Semester : 06	Credits: 3
43	O 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 behavior of first-order and second-order systems.			

	CO ID.	Course name: Project Management (2015605B)	Course year: 2025-2026	Semester : 06	Credits: 2
44	CO316.1	Understand the importance of projects and its phases.			
	CO316.2	Analyze and explain demand forecasting and sales estimation. 			
	CO316.3	Execute projects based on discount and non-discount methods			
	CO316.4	Develop network diagrams for the planning and execution of a given project 			
	CO316.5	Develop and implement different project scheduling and network planning			

	CO ID.	Course name: Building Electrification Laboratory (2020608A)	Course year: 2025-2026	Semester : 06	Credits: 2
45	CO 317 1	Select accessories, wires, cables and wiring systems for electrification			
	CO317 2	Design electrical wiring installation system for residential unit.			
	CO317 3	Design proper illumination scheme for residential unit.			
	CO317.4	Prepare wiring layouts on wiring board.			
	CO317 5	Locate and diagnose faults in electrical wiring installation.			
	CO317 6	Do proper earthing for building electrification			

	CO ID.	Course name: Seminar 2020609 (TW)	Course year: 2025-2026	Semester : 06	Credits: 2
46	CO318.1	Establish motivation for any topic of interest and develop a thought process for technical presentation.			
	CO318.2	Organize a detailed literature survey and build a document with respect to technical publications.			
	CO318.3	Examine and comprehension of proof-of-concept and related data.			
	CO318.4	Effective presentation and improve soft skills.			
	CO318.5	Make use of new and recent technology for creating a technical report			

	CO ID.	Course name: 2020610 - Major Project (TW)	Course year: 2025-2026	Semester : 06	Credits: 3
47	CO319.13	Analyse and identify the problem and technology to be adopted			
	CO319.14	Function as a team in the planning and execution of the Minor project work			
	CO319.15	Apply appropriate knowledge of engineering to achieve identified objectives of the Minor project			
	CO319.16	Create a demonstrable output			

	CO ID.	Course name: 2020611 Course Under Moocs TW	Course year: 2025-2026	Semester : 06	Credits: 1
48	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.			