



**SHRI GAJANAN SHIKSHAN SANSTHA'S**  
**SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING**  
**SHEGAON – 444203, DIST. BULDANA (MAHARASHTRA STATE), INDIA**  
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2.6.1 CO –PO displayed on website and communicated

Sr. No.	Evidence Head
1	CO Statements
2	PO and PSOs are communicated to all stakeholders



Principal



**SSGMCE SHEGAON**  
**DEPARTMENT OF ELECTRICAL ENGINEERING**

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**COURSE OUTCOMES OF ALL COURSES OF FIRST SEMESTER**  
**BE ELECTRICAL (ELECTRONICS & POWER)**

**1A1 ENGINEERING MATHEMATICS - I**

After completing this course, student will be able to

1. Find  $n^{\text{th}}$  order derivative of functions and product of functions and expand the function in a power series and evaluation of limits of indeterminate forms.
2. Find the partial derivatives and Jacobian of explicit and implicit functions
3. Obtain maxima and minima of a function with constraints by using Lagrange's method of undetermined multipliers.
4. Find the powers and roots of complex numbers, separate the complex quantity in real & imaginary parts, and find the logarithms of complex numbers.
5. Able to solve ordinary differential equations of first order and first degree by various methods and apply these to solve problems in engineering fields.
6. Able to solve ordinary differential equations of first order and higher degree by various methods

**1A2 ENGINEERING PHYSICS**

After completing this course, student will be able to

1. To apply the knowledge of solid-state devices such as semiconductor diode, Zener diode & LED in various Electronics applications.
2. To apply the knowledge of Quantum Mechanics in engineering fields
3. To apply the principles of electron ballistics to demonstrate the functioning of CRO & mass spectrograph.
4. To apply the principles of geometrical optics such as interference & diffraction in various engineering fields
5. To apply the principles of fiber optics, LASER & fundamentals of acoustics, ultrasonics & fluid dynamics in various engineering domains

### **1A3 ENGINEERING MECHANICS**

After completing this course, student will be able to

1. Compose and resolve the forces along with its effect.
2. Apply principles of statics to the system of rigid bodies and analyse simple structures.
3. Calculate frictional forces for simple contact, wedges and belt friction.
4. Locate centroid and calculate moment of inertia.
5. Calculate various kinematic quantities.
6. Solve the problems using different kinetic equations related to direct and interconnected particles.
7. Apply principle of conservation of momentum and laws of impact.

### **1A4 COMPUTER PROGRAMMING**

After completing this course, student will be able to

1. To explain fundamental concepts of computer and computing.
2. To test and execute the programs and correct syntax and logical errors.
3. To demonstrate various operators and expressions to solve real life problems.
4. To demonstrate various concepts of control structure to solve complex problems
5. To use arrays, strings and structures to formulate algorithms and programs.
6. To demonstrate various concepts of functions, pointers and file handling mechanism.

### **1A5 WORKSHOP PRACTICE**

After completing this course, student will be able to

1. Upon completion of this course, the students will gain knowledge of different manufacturing processes which are commonly employed in industry.
2. Upon completion of this course, the students will be able to fabricate the components using various manufacturing techniques.
3. The students will be conversant with the concept of dimensional accuracy and tolerances.



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**COURSE OUTCOMES OF ALL COURSES OF FOURTH SEMESTER**  
**BE ELECTRICAL (ELECTRONICS & POWER)**

**4EP01 ELECTROMAGNETIC FIELD**

After completing this course, student will be able to

1. Demonstrate the understanding of basic mathematical concepts related to electromagnetic vector fields
2. Apply the principles of electrostatics to the solutions of problems relating to electric field
3. Apply the principles of magneto statics to the solutions of problems relating to magnetic field
4. Apply Maxwell's equation in different forms (differential and integral) to diverse engineering problems.

**4EP02 ELECTRICAL MEASUREMENT & INSTRUMENTATION**

After completing this course, student will be able to

1. Classify the various measuring instruments like PMMC, MI, Electrodynamometer, and Induction type instruments for measurement of current, voltage, power, and energy.
2. Demonstrate the construction & working of Instrument Transformers and special purpose meters.
3. Analyze various methods for measurement of resistance, inductance, and capacitance using AC/DC bridges.
4. Explain the working of various Digital measuring instruments.
5. Explain the generalized Instrumentation system & working of different transducers.

**4EP03 CONTROL SYSTEM**

After completing this course, student will be able to

1. Demonstrate the fundamental concepts of automatic Control and mathematical modelling of the System
2. Determine the transfer function of control system components
3. Analyze the time response of various systems and performance of controllers
4. Evaluate the stability of linear systems using various methods

#### **4EP04 NUMERICAL METHODS & OPTIMIZATION TECHNIQUES**

After completing this course, student will be able to

1. Determine solutions for linear and simultaneous equations using numerical methods.
2. Apply various curve fitting techniques.
3. Make use of various numerical methods for solving Numerical differentiation, integration, and Differential Equations.
4. Determine the optimum scheduling by using CPM and PERT.

#### **4EP05 ANALOG & DIGITAL CIRCUITS**

After completing this course, student will be able to

1. Explain the principles of operational amplifiers, parameters of op-amp
2. Illustrate the linear and nonlinear applications of op-amp
3. Demonstrate the knowledge of Voltage regulator and Timer ICs
4. Describe the working of Logic families and their applications.
5. Demonstrate the knowledge of combinational and sequential circuits and its application



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**COURSE OUTCOMES OF ALL COURSES OF SIXTH SEMESTER**  
**BE ELECTRICAL (ELECTRONICS & POWER)**

**6EP01 POWER ELECTRONICS**

After completing this course, student will be able to

1. Explain the knowledge about fundamental concepts and techniques used in power electronics
2. Analyze various single phase and three phase power converter and Inverter circuits
3. Analyze the operation of DC/DC and AC/AC converter circuits
4. Implement industrial applications of power electronic circuits.

**6EP02 ELECTRICAL ENERGY DISTRIBUTION & UTILIZATION**

After completing this course, student will be able to

1. Demonstrate the knowledge of distribution substation
2. Compare different power distribution systems
3. Describe elements of distribution Automation system
4. Select proper electrical drive for industrial applications
5. Explain the working of electric traction system
6. Design an illumination system for various locations

**6EP03 COMPUTER AIDED ELECTRICAL MACHINE DESIGN**

After completing this course, student will be able to

1. Apply the suitable method for Computer aided machine design & select the proper material .
2. Design the single phase & three phase transformer.
3. Evaluate the performance of the transformer from its design data
4. Design the three phase Induction motor
5. Develop the computer program for design of transformer and three phase IM

#### **6EP04 ADVANCE CONTROL SYSTEM (Professional Elective – II)**

After completing this course, student will be able to

1. Design compensator using time and frequency domain specifications
2. Analyze the system using state space Model
3. Apply Z Transform to analyse Digital systems
4. Analyze the Nonlinear systems

#### **6EP04 PROCESS CONTROL SYSTEMS (Professional Elective – II)**

After completing this course, student will be able to

1. Explain the various Electronic Instruments for measurement of electrical parameters.
2. Analyse the different signals
3. Demonstrate the signal counting, recording and working of digital readout devices.
4. Demonstrate the Various techniques of A/D and D/A conversions.
5. Apply various signal processing tools as per requirement
6. Develop ladder diagrams & programmes for PLC

#### **6EP05 ENERGY AUDIT & MANAGEMENT (Open Elective - II)**

After completing this course, student will be able to

1. Discuss energy scenario and it's management.
2. Conduct the energy audit of different systems.
3. Determine the economics of energy conservation
4. Discuss various energy Conservation methods & their case studies
5. Explain fundamentals of Harmonics.

#### **6EP05 ELECTRICAL ESTIMATING & COSTING (Open Elective – II)**

After completing this course, student will be able to

1. Understand methods of installation and estimation of service connection
2. Decide type of wiring, its estimation and costing for residential building
3. Carry out electrification of commercial complex, factory unit installations
4. Design & estimate for feeders & distributors
5. Understand contract, tendering and work execution process.



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**COURSE OUTCOMES OF ALL COURSES OF EIGHTH SEMESTER**  
**BE ELECTRICAL (ELECTRONICS & POWER)**

**SEP01 POWER SYSTEM PROTECTION**

After completing this course, student will be able to

1. Explain the construction, working and characteristics of different types of protective relays.
2. Develop the protection systems for Distribution and transmission line.
3. Develop the protection systems for various elements of a power system like Alternators, Transformers, Motors & Busbar.
4. Explain the construction & working of different types of circuit breakers, MCB, ELCB, RCCB & fuses.

**SEP02 COMPUTER METHODS IN POWER SYSTEM ANALYSIS**

After completing this course, student will be able to

1. Develop mathematical model to represent the power system components
2. Demonstrate the topology of electrical power system.
3. Formulate Bus Impedance & admittance matrices for Power System Network
4. Conduct short circuit studies of electrical power system.
5. Carry out the load flow Analysis of electrical power system.
6. Perform stability study of electrical power system

**SEP03 HIGH VOLTAGE ENGINEERING (Professional Elective-V)**

After completing this course, student will be able to

1. Explain the breakdown mechanism in solid, liquid, and gaseous dielectrics.
2. Select an appropriate protective device to protect the power system against overvoltage's caused by internal and external causes.
3. Utilize different circuits for the generation of high AC, DC, and impulse voltages.
4. Measure high AC, DC, and impulse voltages.
5. Test the insulation of various high voltage apparatus used in the power system.



### **SEP03 HVDC and FACTS (Professional Elective-V)**

After completing this course, student will be able to

1. Discuss different components of HVDC transmission system.
2. Explain the operation and control of HVDC converters.
3. Identify the suitable reactive power compensation technique and filter for HVDC system.
4. Choose proper FACTS controller for the specific application based on system requirements.
5. Analyze the circuits of static shunt and static series compensators used for the prevention of voltage instability and improvement of transient stability and power damping oscillations.
6. Demonstrate the knowledge of Unified power flow controller (UPFC).

### **SEP04 POWER QUALITY (Professional Elective-VI)**

After completing this course, student will be able to

1. Illustrate the concept, need, and standards of Power Quality
2. Classify Power quality characteristics
3. Select power conditioning device for mitigation of power quality problem
4. Make use of measurement tools for power quality survey

### **SEP04 ELECTRICAL ENERGY CONSERVATION AND AUDITING (Professional Elective-VI)**

After completing this course, student will be able to

1. Summarize Indian and global energy scenario.
2. Explain types of energy Audit and its procedure.
3. Discuss economics of energy conservation
4. Elaborate the concepts of energy conservation and management.
5. Choose Appropriate energy efficient techniques for energy conservation
6. Apply the understanding of energy conservation and management for industrial applications.