



**BANSAL INSTITUTE OF RESEARCH & TECHNOLOGY, BHOPAL**  
**Kokta Anand Nagar, Bhopal**  
**DEPARTMENT OF ELECTRICAL & ELECTRONICS**  
**ENGINEERING**  
**COURSE OUTCOMES (COs)**

**Semester: VII**

|                                             |                                                                                     |                            |
|---------------------------------------------|-------------------------------------------------------------------------------------|----------------------------|
| <b>Course Name: Power System Protection</b> |                                                                                     | <b>Course Code: EX-701</b> |
| <b>Students will be able to:</b>            |                                                                                     |                            |
| <b>CO1:</b>                                 | Analyze various types of faults in Power system                                     |                            |
| <b>CO2:</b>                                 | Select different types of relays in power system.                                   |                            |
| <b>CO3:</b>                                 | Analyze different types of circuit breakers in power system.                        |                            |
| <b>CO4:</b>                                 | Develop protection of transmission line and feeder from various faults.             |                            |
| <b>CO5:</b>                                 | Investigate protection arrangements for transformer, alternator, motor and bus bar. |                            |

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| <b>Course Name: Departmental Elective<br/>(Power Electronics Application to Power System)</b> |                                                                        | <b>Course Code: EX-702 (A)</b> |
| <b>Students will be able to:</b>                                                              |                                                                        |                                |
| <b>CO1:</b>                                                                                   | Distinguish the performance analysis of various FACTS devices.         |                                |
| <b>CO2:</b>                                                                                   | Analysis of FACTS controller with Control strategies.                  |                                |
| <b>CO3:</b>                                                                                   | Classify the harmonics problems and their reduction methods.           |                                |
| <b>CO4:</b>                                                                                   | Differentiate the active power controllers and energy storage systems. |                                |
| <b>CO5:</b>                                                                                   | Analysis of FACTS controller with Power quality problem.               |                                |



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| <b>Course Name: Open Elective<br/>(Energy Audit &amp; Management)</b> |                                                                                                                          | <b>Course Code: EX-703 (B)</b> |
| <b>Students will be able to:</b>                                      |                                                                                                                          |                                |
| <b>CO1:</b>                                                           | Formulate tasks & duties of an energy auditor and energy manager along with recommendation of conservation measures.     |                                |
| <b>CO2:</b>                                                           | Assess and compile predictive and preventive measures of energy saving for residential, commercial and industrial areas. |                                |
| <b>CO3:</b>                                                           | Examine principles relating economy and load management for energy conservation and load management.                     |                                |
| <b>CO4:</b>                                                           | Demonstrate and recommend proper utilization of energy efficient electric drives.                                        |                                |
| <b>CO5:</b>                                                           | Propose various energy conservation measures to residential, commercial and industrial sectors.                          |                                |

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| <b>Course Name: Departmental Lab<br/>(Electrical CAD Lab)</b> |                                                                                                                 | <b>Course Code: EX-704</b> |
| <b>Students will be able to:</b>                              |                                                                                                                 |                            |
| <b>CO1:</b>                                                   | Illustrate standard symbolic representations of electrical components using manual drawing techniques.          |                            |
| <b>CO2:</b>                                                   | Develop freehand sketches, isometric views, and orthographic projections of electrical machines and components. |                            |
| <b>CO3:</b>                                                   | Construct electrical circuits using CAD tools by selecting and integrating appropriate components.              |                            |
| <b>CO4:</b>                                                   | Design a single-phase transformer using fundamental electrical design principles.                               |                            |
| <b>CO5:</b>                                                   | Design a DC machine using CAD tools with its major constructional features.                                     |                            |



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| <b>Course Name: Open Elective Lab<br/>(Energy Audit Lab)</b> |                                                                                                                                       | <b>Course Code: EX-705</b> |
| <b>Students will be able to:</b>                             |                                                                                                                                       |                            |
| <b>CO1:</b>                                                  | Understand the energy conservation policies, standards, and regulatory frameworks applicable in India.                                |                            |
| <b>CO2:</b>                                                  | Analyze energy utilization in electrical machines and appropriate energy conservation techniques to improve efficiency.               |                            |
| <b>CO3:</b>                                                  | Apply energy conservation methods in electrical installations, cogeneration systems, and tariff structures to minimize energy losses. |                            |
| <b>CO4:</b>                                                  | Evaluate energy consumption patterns in electrical systems.                                                                           |                            |
| <b>CO5:</b>                                                  | Propose technically and economically viable energy conservation measures based on audit findings for electrical facilities.           |                            |

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| <b>Course Name: Major Project - I</b> |                                                                                           | <b>Course Code: EX-706</b> |
| <b>Students will be able to:</b>      |                                                                                           |                            |
| <b>CO1:</b>                           | Choose potential problem based on literature survey/impending industrial/real time needs. |                            |
| <b>CO2:</b>                           | Classify various solution methodologies to solve problem taken for study.                 |                            |
| <b>CO3:</b>                           | Judge the design steps or experimental procedure relevant to the problem.                 |                            |
| <b>CO4:</b>                           | Examine results and findings obtained.                                                    |                            |
| <b>CO5:</b>                           | Recommend solutions to potential engineering problems.                                    |                            |



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| <b>Course Name: Evaluation of Internship - III</b> |                                                                                        | <b>Course Code: EX-607</b> |
| <b>Students will be able to:</b>                   |                                                                                        |                            |
| <b>CO1:</b>                                        | Identify their areas of interest as per their training requirement.                    |                            |
| <b>CO2:</b>                                        | Formulate problems and try to find their solution through gained knowledge.            |                            |
| <b>CO3:</b>                                        | Adapt actual engineering environment.                                                  |                            |
| <b>CO4:</b>                                        | Develop the habit of utilization of technical resources.                               |                            |
| <b>CO5:</b>                                        | Develop training report and give oral presentations related to the training completed. |                            |

**Approved By: -**  
**Head of Department**