TULSIRAMJI GAIKWAD-PATIL
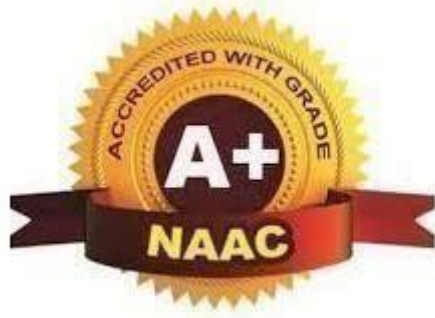## College of Engineering & Technology

Mohgaon, Wardha Road, Nagpur - 441 108

An Autonomous Institute

A+ NAAC

NATIONAL BOARD of ACCREDITATION

DEPARTMENT OF ELECTRICAL ENGINEERING

M.Tech. Integrated Power System

Course Outcomes

Considering

National Education Policy 2020

From

Academic Year 2024-25

Program: M.Tech. Integrated Power System (IPS)

Course Wise Course Outcomes

Semester-II	MIP21201: Advanced Power System Protection	
Course Code	**Course Outcomes**	**CL**
MIP21201.1	**Predict** basic philosophy of power system protection.	3
MIP21201.2	**Evaluate** various parameters of short & long transmission line	3
MIP21201.3	**Apply** protective relaying for transformers, machines, bus bars and transmission lines.	4
MIP21201.4	**Demonstrate** the principle, construction and application of numerical relays	4
MIP21201.5	**Articulate** the algorithms used for fault analysis.	3

Semester-II	MIP21202: HVDC and Facts	
Course Code	**Course Outcomes**	**CL**
MIP21202.1	**Describe** types of topology and multi terminal HVDC System	3
MIP21202.2	**Describe** converter operation in various modes.	3
MIP21202.3	**Analyse** the fault in HVDC system and provide proper protection.	4
MIP21202.4	**Apply** shunt, series and their combination for compensation.	3
MIP21202.5	**Identify**, formulate and solve network problems with FACTS controller	3

Semester-II	MIP21204: FACTS & Custom Power Devices	
Course Code	**Course Outcomes**	**CL**
MIP21204.1	**Analyze** the performance of Transmission line with and without FACTS Devices	4
MIP21204.2	**Relate** Static VAR Compensator (SVC) and Static Synchronous Compensator (STATCOM)	3
MIP21204.3	**Correlate** the operation and control of various Static Series Compensators	4
MIP21204.4	**Articulate** Sub Synchronous Resonance and how it is mitigated and the operation and control of UPFC	3
MIP21204.5	**Illustrate** various power quality issues and how are they mitigated by various FACTS Devices	4

Semester-II	MIP21205: Artificial Intelligence in Power System	
Course Code	**Course Outcomes**	**CL**
MIP21205.1	**Illustrate** the fundamentals of Artificial Intelligence and its characteristics	3
MIP21205.2	**Classification** of different aspect of Ontology and Predicate Logic	4
MIP21205.3	**Determine** the parameters of Fuzzy logic and its control.	5
MIP21205.4	**Analyze** the types of expert systems	4
MIP21205.5	**Design** and develop application of AI in Power Systems	6

Semester-II	MIP21206: Power System Transients	
Course Code	**Course Outcomes**	**CL**
MIP21206.1	**Explain** the causes and effects of transients on power systems and electrical circuits.	4
MIP21206.2	**Analyze** the causes, effects, and waveforms of switching transients in electrical circuits, and evaluate the impact of resistance and load switching on system stability and protection.	4
MIP21206.3	**Explain** the formation and discharge mechanisms of lightning, and evaluate effective protection strategies to mitigate lightning transients in power systems.	4
MIP21206.4	**Analyze** the transient response on transmission lines, applying traveling wave theory, reflection, refraction, and standing wave concepts to evaluate system behavior	4
MIP21206.5	**Analyze** the transient behavior in integrated power systems due to faults, switching operations, and load changes, and apply EMTP for effective transient management and system design.	4

Semester-II	MIP21207: Power System Dynamics & Stability (PE-IV)	
Course Code	**Course Outcomes**	**CL**
MIP21207.1	**Describe** the operation of power flow studies in power system.	4
MIP21207.2	**Examine** topical issues of stability study due to various faulty conditions	4
MIP21207.3	**Analyze** types of methods to improve stability in integrated power Systems.	4
MIP21207.4	**Examine** topical issues of transient stability	4
MIP21207.5	**Enable** Augmentation of stability of turbine governor control.	4

Semester-II	MIP21208: Program Elective -IV: Utilization of Electrical Energy	
Course Code	**Course Outcomes**	**CL**
MIP21208.1	**Judge** the suitability of different motor drives to be used for a specific purpose.	4
MIP21208.2	**Develop**, select, and apply appropriate techniques for designing indoor & outdoor lighting schemes.	5
MIP21208.3	**Design** and develop smart electrical heating systems through the use of modern Electrical Engineering and IT tools.	6
MIP21208.4	**Design** and develop smart electrical welding systems through the use of modern Electrical Engineering and IT tools.	6
MIP21208.5	**Create**, select, and apply appropriate techniques, tools and resources in designing/developing electrolytic and electrometallurgical processes	5

Semester II:	MIP21209: Neural Network and Fuzzy Application in Power System (Program Elective-IV)	
Course Code	**Course Outcomes**	**CL**
MIP21209.1	**Explain** the role and components of AI, ANNs, and FLS in modern power systems.	2
MIP21209.2	**Implement** ANN-based models for load forecasting, fault detection, and system optimization.	3
MIP21209.3	**Analyze** the effectiveness of fuzzy logic controllers in voltage stability and energy management	4
MIP21209.4	**Design** hybrid Neuro-Fuzzy solutions for smart grid stability and protection challenges.	6
MIP21209.5	**Evaluate** AI-driven innovations for renewable integration and blackout prevention in power systems	5

Semester II:	MIP21203: Electrical Power System Lab - II	
Course Code	**Course Outcomes**	**CL**
MIP21203.1	**Evaluate** the Parameters of Transmission Lines and Bus Admittance and Impedance Matrices using ETAP	3
MIP21203.2	**Solve** power flow using Newton-Raphson & Gauss-Seidal Iterative Method	3
MIP21203.3	**Evaluate** Single Machine & Multi Machine Infinite Bus System using MATLAB	5
MIP21203.4	**Design** Load – Frequency Dynamics of Single Area Power Systems	3
MIP21203.5	**Implement** Two Port Network using various parameters	5