

Nirma University
Institute of Technology
M.Tech. in Electrical Engineering (Electrical Power Systems)

Semester – I

Course Code	3EE2109
Course Title	Power System Dynamics

Course Learning Outcomes (CLO):

At the end of the course, students will be able to-

1. model various system components, apparatus mathematically
2. analyze effects of changes in any of the model parameter(s)
3. express the system dynamics, mathematically prove it and suggest corrective actions

L	T	P	C
3	0	0	3

Course Code	3EE2110
Course Title	Power System Analysis

Course Learning Outcomes (CLO):

At the end of the course, students will be able to-

1. select and apply the most appropriate algorithm for load-flow and short circuit studies.
2. formulate and solve problems related with economic operation of power system.
3. demonstrate understanding about complex issues related to security and state estimation of power system.

L	T	P	C
3	0	2	4

Course Code	3EE2111
Course Title	Power Electronics in Power System

Course Learning Outcomes (CLO):

At the end of the course, students will be able to-

1. illustrate the operation and control of power electronic converters
2. devise the control of static VAR compensators
3. analyse different power quality issues
4. acquire knowledge about the harmonics, harmonic introducing devices, effect of harmonics on system equipment & loads and harmonic filtering

L	T	P	C
3	0	2	4

Course Code	3EE2112
Course Title	Renewable Energy Technology

Course Learning Outcomes (CLO):

At the end of the course, students will be able to-

1. interpret the economics of renewable energy systems
2. conceptualize and design photovoltaic system
3. acquire knowledge about different types of solar and wind energy conversion technology and its grid interface

L	T	P	C
3	0	2	4

Course Code	3EE2113
Course Title	Protective Relaying and Switchgear

Course Learning Outcomes (CLO):

At the end of the course, students will be able to-

1. judge fault clearing phenomena under abnormal conditions
2. develop mathematical approach towards protection
3. select appropriate algorithm for numerical protection
4. implement various protection schemes and use modern approaches of relaying in power system protection

L	T	P	C
3	0	2	4

Semester – II

Course Code	3EE2210
Course Title	Power System Stability and Control

Course Learning Outcomes (CLO):

L	T	P	C
3	0	2	4

At the end of the course, students will be able to-

1. articulate causes and effects of different types of power system stability
2. apply and adapt the applications of mathematics and engineering tools in the analysis of stability problems
3. suggest possible solution(s) to address the stability issue(s)

Dept. Elective – I

Course Code	3EE22D101
Course Title	Power System Transients

Course Learning Outcomes (CLO):

L	T	P	C
3	0	2	4

At the end of the course, students will be able to -

1. analyse the effects of various changes in circuit parameters
2. examine the causes of transients, simulate and analyse them
3. suggest appropriate solution for case(s) / problem(s) arising out of power system transients

Course Code	3EE22D102
Course Title	Advances in High Voltage Engineering

Course Learning Outcomes (CLO):

L	T	P	C
3	0	2	4

At the end of the course, students will be able to -

1. decide appropriate insulating material for HV applications
2. prepare specifications, design the circuit for the HV insulation test systems
3. apply pulse power technology for insulation testing and societal benefits
4. choose proper test method for non-destructive testing of HV apparatus

Course Code	3EE22D103
Course Title	Applications of AI and Optimization in Power Systems

Course Learning Outcomes (CLO):

L	T	P	C
3	0	2	4

At the end of the course, students will be able to-

1. Make use of classical and advanced techniques in optimization
2. apply knowledge of optimization theory in electrical power systems
3. develop AI / optimization based solutions for power system problems

Dept. Elective – II

Course Code	3EE22D201
Course Title	Electrical Distribution Systems

Course Learning Outcomes (CLO):

At the end of the course, students will be able to-

L	T	P	C
3	0	0	3

1. apply different techniques to analyse electrical distribution system
2. design distribution management system and distribution system automation
3. solve distribution system problems with optimization

Course Code	3EE22D202
Course Title	Restructured Power Systems

Course Learning Outcomes (CLO):

At the end of the course, students will be able to -

L	T	P	C
3	0	0	3

1. analyze various Power market models, their operations and requirements
2. identify the roles and responsibilities of different entities in Power market
3. explore and resolve issues to optimize the power system economics using various models and markets

Course Code	3EE22D203
Course Title	Distributed Power Generation

L	T	P	C
3	0	0	3

Course Learning Outcome (CLO):

At the end of the course, students will be able to -

1. explore specific renewable generation technology for use and related economics
2. design microgrid for a standalone system, integration with grid and solve related issues
3. perform system studies for distributed power generation

Dept. Elective – III

Course Code	3EE22D301	L	T	P	C
Course Title	Substation Engineering	3	0	0	3

Course Learning Outcomes (CLO):

At the end of the course, students will be able to -

1. apply the electrical concepts in designing and operation of substations
2. plan the protection aspects pertaining to equipment and human safety in the substation
3. suggest approaches for substation automation, be familiarise about integration and communication protocols

Course Code	3EE22D302
Course Title	Smart Grid Technologies

Course Learning Outcome (CLO):

At the end of the course, students will be able to -

1. select grid architecture(s) and evaluate implementation aspects / issues
2. offer integration of smart technologies into electric power grid and provide deployment solution(s)
3. examine impact of policies and market framework for smart grid

L	T	P	C
3	0	0	3

Course Code	3EE22D303
Course Title	EHV AC Transmission and FACTS

Course Learning Outcomes (CLO):

At the end of the course, students will be able to -

1. estimate the line parameters of EHV AC transmission lines
2. compute electrostatic field of AC lines and analyze their effect on voltage gradient
3. conceptualize the design of EHV lines with respect to steady & transient limits
4. analyze different types of FACTS controllers and their role in improving power system performance

L	T	P	C
3	0	0	3

Course Code	3EE2211
Course Title	Minor Project

Course Learning Outcomes (CLO):

After successful completion of the course, student will be able to -

1. broadly select the area / sub – domain of choice to pursue research
2. develop hands – on expertise on a relevant electrical engineering software / hardware
3. analyze performance of a specific electrical network with a detailed insight into its various functional components / models
4. evaluate any electrical network problem / issue with domain related applications

L	T	P	C
0	0	10	5

Course Code	3SS1201
Course Title	Research Methodology and IPR

Course Learning Outcomes (CLO):

At the end of the course, students will be able to -

1. formulate a research problem for a given engineering domain.
2. analyse the available literature for given research problem.
3. develop technical writing and presentation skills.
4. comprehend concepts related to patents, trademark and copyright.

L	T	P	C
2	0	0	2

Semester - III

Course Code	3EE2302
Course Title	Major Project Part - I

L	T	P	C
-	-	-	14

Course Learning Outcomes (CLO):

After successful completion of the course, student will be able to -

1. understand the issues related with the recent trends in the field of engineering and its applications
2. formulate the problem definition, analyze and carry out functional simulation
3. design, implement, test and verify the engineering solution related to problem definition
4. compile, comprehend and present the work carried out
5. manage project

Semester - IV

Course Code	3EE2402
Course Title	Major Project Part - II

L	T	P	C
-	-	-	14

Course Learning Outcomes (CLO):

After successful completion of the course, student will be able to -

1. understand the issues related with the recent trends in the field of engineering and its applications
2. formulate the problem definition, analyze and carry out a functional simulation
3. design, Implement, test and verify the engineering solution related to problem definition
4. compile, comprehend and present the work carried out
5. manage project