SCHEME OF COURSE WORK

Course Details:

Course Title	**DISTRIBUTION AUTOMATION**		
Course Code	**15EE2104**	**L P C**	**3 0 3**
Program:	**Master of Technology.**		
Specialization:	**Power System and Control Automation**		
Semester	**I**		
Prerequisites	**Power Distribution Engineering**		
Courses to which it is a prerequisite	**Research**		

Course Outcomes (COs):

1	Describe the necessity of Distribution Automation, DAS Hardware and DAS Software.
2	Outline DA Capabilities and Management Processes supported by DA.
3	Distinguish between different Communication Systems used in DA
4	Discuss the Technical Benefits of DA and Economic Evaluation, of DA on Distribution System.
5	Explain the Procedure & Methods available for Economic Evaluation DA Alternate Plans.

Program Outcomes (POs):

A graduate of Electrical & Electronics Engineering will be able to

1	Acquire in depth knowledge in the area of power system control and automation.
2	attain the ability to think critically and analyze complex engineering problems related to power system control and automation
3	Obtain the capability of problem solving and original thinking to arrive at feasible and optimal solutions considering societal and environmental factors
4	Extract information through literature survey and apply appropriate research methodologies, techniques and tools to solve power system problems.
5	Use the state-of-the-art tools for modelling, simulation and analysis of problems related to power systems
6	Attain the capability to contribute positively to collaborative and multidisciplinary research to achieve common goals
7	Demonstrate knowledge and understanding of power system engineering and management principles and apply the same for efficiently carrying out projects with due consideration to economical and financial factors.
8	Communicate confidently, make effective presentations and write good reports with engineering community and society
9	Recognize the need for life-long learning and have the ability to do it independently
10	Become socially responsible and follow ethical practices to contribute to the community for sustainable development of society.
11	Independently observe and examine critically the outcomes of his actions and reflect on to make corrective measures subsequently and move forward positively by learning through mistakes

Course Outcome Versus **Program Outcomes:**

COs\POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO-1	S	S	S	S	S	M	W	M	M	W	W
CO-2	S	S	S	S	S	M	S	S	W	M	M
CO-3	S	S	S	S	S	M	M	W	W	W	M
CO-4	S	S	S	M	M	W	W	W	W	W	W

S - Strongly correlated, *M - Moderately* correlated, *W-Weakly correlated*

Assessment Methods:	Assignment / Quiz / Seminar / Group Discussions / Case Study / Mid-Test / End Exam

Teaching-Learning and Evaluation

Week	TOPIC / CONTENTS	Course Outcomes	Sample questions	TEACHING-LEARNING STRATEGY	Assessment Method & Schedule
1	Introduction to Distribution Automation (DA), Distribution Automation and the Utility System, Control Systems Interfaces,	CO-1	Define the following terms And briefly explain. (i)Distribution Automation System (ii) Utility System	▫ Lecture through Black Board & LCD ▫ Discussion	Seminar/Mid Test (Week 8 -9)
2	Control and Data Requirements Centralized(Vs)Decentralized control, DA System(DAS),	CO-1	Compare Centralized and Decentralized Control of Distribution Automation	▫ Lecture through Black Board & LCD ▫ Discussion	Seminar/Mid Test (Week 8 -9)
3,4	DA Hardware and DAS Software	CO-2	Discuss DA Hardware and DAS Software.	▫ Lecture through Black Board & LCD ▫ Discussion	Seminar/Mid Test (Week 8 -9)
5,6	Distribution Automation Functions:, DA Capabilities Automation System Computer facilities,	CO-1,2	What are DA Capabilities?	▫ Lecture through Black Board & LCD ▫ Problem solving	Seminar/Mid Test (Week 8 -9)
7	Management Process, Information Management, System Reliability Management, System Efficient Management, Voltage Management, Load Management	CO-2	Explain the following Management processes Supported by DA (i) System Reliability Management (ii)System Efficiency Management	▫ Lecture through Black Board & LCD Problem solving	Seminar/Mid Test (Week 8 -9)
8	Communication System for DA: DA Communication Requirements, Communication Reliability, Cost Effectiveness, Data Rate Requirements, Two way Capability Ability to Communicate during outages and faults, Ease of operation and maintenance Confirming Architecture of Data Flow	CO-3	What are the desirable Characteristics of Communication systems Required for Distribution Automation? Explain them	▫ Lecture through Black Board & LCD Discussion	Seminar/Mid Test (Week 8-9)
9	Mid-Test 1				Week 9
10	Communication Systems used in DA: Distribution Line Carrier (Power Line Carrier, Ripple Control, Zero Crossing Technique, Telephone, Cable TV,	CO-3	List out the various Communication techniques Used for DA .Describe Them with relevant diagrams.	▫ Lecture through Black Board & LCD Discussion	Seminar/Mid Test (Week 18-19)
11	Radio : AM Broadcast, FMSCA, VHF, Microwave, Satellite, Fiber Optics, Hybrid Communication Systems, Communication Systems used in field tests.	CO-4	What is Hybrid Communication System? Briefly explain with diagram	▫ Lecture through Black Board & LCD Discussion	Seminar/Mid Test (Week 18-19)
12	Technical Benefits: DA Benefits Categories, Capital Deferred Savings Operation and maintenance Savings ,Interruption Related Savings, Customer Related Savings, Operational Savings, Improved operation,	CO-5	What are potential benefit Categories of Distribution Automation? Discuss them With benefit examples.	▫ Lecture through Black Board & LCD Discussion	Seminar/Mid Test (Week 18-19)

13	Function Benefits, Potential Benefits for Functions Function Shared Benefits, Guidelines for formulation of estimation equations,	CO-5	Discuss potential benefits And function shared benefits?	▫ Lecture through Black Board & LCD Discussion	Seminar/Mid Test (Week 18-19)
14	Parameters required, Economic impact areas, Integration of benefits into economic Evaluation, Resources for determine benefits, Impact on distribution System,		Describe the impact of Distribution automation on Distribution system	▫ Lecture through Black Board & LCD Discussion	Seminar/Mid Test (Week 18-19)
15	Economic Evaluation Methods, Development and Evaluation of Alternatives Plans, Select Study Area, Select Study Period, Project Load Growth, Develop alternatives, Calculate and Operating and Maintenance Costs, Evaluate Alternatives		Explain in detail the Procedure for development And evaluation of alternate Distribution plans to meet The distribution Requirements of a particular Geographic area.	▫	Seminar/Mid Test (Week 18-19)
16	Economic Comparison of Alternate Plans, Classification of Expenses and capital expenditures, Comparison of revenue requirements of alternatives plans ,Book life and continuing plant analysis		Distinguish between Expenses and Capital Expenditure with examples	▫	Seminar/Mid Test (Week 18-19)
17	Year by Year revenue requirement analysis, Short term Analysis, End of Study Adjustments, Break even Analysis, Sensitivity analysis, Computational aids, Major steps in utility economic evaluation of Distribution Automation		Whatdo you understand by Sensitivity Analysis in economic evaluation of DA Alternate Plans.	▫	Seminar/Mid Test (Week 18-19)
18	**STUDENTS SEMINAR**	Seminar (Week 15)		▫	
19	**Mid-Test 2**				Week 19
20	**END EXAM**				