MARTHANDAM COLLEGE OF ENGINEERING AND TECHNOLOGY

K.K.DISTRICT

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

POWER SYSTEM SIMULATION LABORATORY

Equipments Available In The Lab

Sl. No	EQUIPMENTS
1	Desktop
2	Printer
3	Server
4	Software: ETAP Power system simulation software
5	Compilers: C/ C++
6	Air Conditioner LG
7	LAN switch

COURSES OFFERED

Sl. No	Odd Sem (Course code & Name)	Class	Even Sem (Course code & Name)	Class
1	EE3512-Control & Instrumentation Laboratory	III Year EEE	EE3611-Power System Laboratory	III Year EEE
2	EE8711-Power System Simulation Laboratory	IV Year EEE		

2023-2024 ODD SEMESTER

EE3512- CONTROL AND INSTRUMENTATION LABORATORY

COURSE OBJECTIVES:

- To make the students familiarize with various representations of systems.
- To make the students analyze the stability of linear systems in the time domain and frequency domain.
- To make the students design compensator based on the time and frequency domain Specifications.

- To develop linear models mainly state variable model and transfer function model
- To make the students to design a complete closed loop control system for the physical systems.

COURSE OUTCOMES:

At the end of this course, the students will demonstrate the ability

CO1: To model and analyze simple physical systems and simulate the performance in analog and digital platform.

CO2: To design and implement simple controllers in standard forms.

CO3: To design compensators based on time and frequency domain specifications.

CO4: To design a complete closed control loop and evaluate its performance for simple physical systems.

CO5: To analyze the stability of a physical system in both continuous and discrete domains.

LIST OF EXPERIMENTS:

1. Analog (op amp based) simulation of linear differential equations.

2. Numerical Simulation of given nonlinear differential equations.

3. Real time simulation of differential equations.

4. Mathematical modeling and simulation of physical systems in at least two fields. Mechanical Electrical Chemical process

5. System Identification through process reaction curve.

6. Stability analysis using Pole zero maps and Routh Hurwitz Criterion in simulation platform.

7. Root Locus based analysis in simulation platform.

8. Determination of transfer function of a physical system using frequency response and Bode's asymptotes.

9. Design of Lag, lead compensators and evaluation of closed loop performance.

10. Design of PID controllers and evaluation of closed loop performance.

11. Discretization of continuous system and effect of sampling.

12. Test of controllability and observability in continuous and discrete domain in simulation platform. 13. State feedback and state observer design and evaluation of closed loop performance.

14. Mini Project 1: Simulation of complete closed loop control systems including sensor and actuator dynamics.

15. Mini Project 2: Demonstration of a closed loop system in hardware

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EE8711- POWER SYSTEM SIMULATION LABORATORY

OBJECTIVES:

- To provide better understanding of power system analysis through digital simulation.

OUTCOMES:

- Ability to understand power system planning and operational studies.
- Ability to acquire knowledge on Formation of Bus Admittance and Impedance Matrices and Solution of Networks.
- Ability to analyze the power flow using GS and NR method
- Ability to find Symmetric and Unsymmetrical fault
- Ability to understand the economic dispatch.
- Ability to analyze the electromagnetic transients.

LIST OF EXPERIMENTS

1. Computation of Transmission Line Parameters

2. Formation of Bus Admittance and Impedance Matrices and Solution of Networks

3. Power Flow Analysis using Gauss-Seidel Method

4. Power Flow Analysis using Newton Raphson Method

5. Symmetric and unsymmetrical fault analysis

6. Transient stability analysis of SMIB System

7. Economic Dispatch in Power Systems

8. Load – Frequency Dynamics of Single- Area and Two-Area Power Systems

9. State estimation: Weighted least square estimation

10. Electromagnetic Transients in Power Systems: Transmission Line Energization

2023-2024 EVEN SEMESTER

EE3611 - POWER SYSTEM LABORATORY

COURSE OBJECTIVES:

1. To provide a better understanding of modelling of transmission lines in impedance and admittance forms.

2. To apply iterative techniques for power flow analysis and to carry out short circuit and stability studies on power system.

3 .To analyze the load – frequency and voltage controls.

4 .To analyze optimal dispatch of generators and perform state estimation.

5. To understand the operation of relays, characteristics, and applications.

COURSE OUTCOMES:

On the successful completion of the laboratory, students will be able to:

CO1: Model and analyze the performance of the transmission lines.

CO2: Perform power flow, short circuit, and stability analysis for any power system network.

CO3: Understand, design, and analyze the load frequency control mechanism.

CO4: Perform optimal scheduling of generators and compute the state of the power system.

CO5: Understand, analyze, and apply the relays for power system protection.

LIST OF EXPERIMENTS:

1. Computation and modelling of transmission Lines.

2. Formation of Bus Admittance and Impedance Matrices.

3. Power Flow Analysis Using Gauss-Seidel Method.

4. Power Flow Analysis Using Newton Raphson Method.

5. Symmetric and Unsymmetrical Fault Analysis.

6. Transient Stability Analysis of SMIB System.

7. Load – Frequency Dynamics of Single- Area and Two-Area Power Systems.

8. Economic Dispatch in Power Systems.

9. State estimation: Weighted least square estimation.

10. Performance analysis of over current relay.

11. Performance analysis of impedance relay.

12. Testing of CT, PT, and Insulator string.

13. Relay Coordination in Radial Feeder Protection Scheme.