Course Title	Electric Circuits 2
Course Code	EE3300
No. of Credit Hrs (Lecture + Tutorial + Lab)	3 (2+0+1)
No. of Contact Hrs (Lecture + Tutorial + Lab)	4 (2+0+2)
Level-Year	5 – 3
Prerequisite (if any)	EE2401

1) Course Objectives:

The course provides students with the knowledge, skills and ability to:

1. Develop the understanding of power calculations in AC circuits.
2. Find the circuit frequency response.
3. Understand the condition of resonance.
4. Design a simple passive filter.
5. Analyze a three-phase circuit.
6. Understand the mutual inductance and transformers.
7. Deal with two port circuits.

2) Expected Learning Outcomes:

By the end of this course the student will be able to:

1. Identify and explain theoretical principles of AC circuits, resonance, three-phase systems, coupled inductors, and filters. KLO1 [1]
2. Analyze and solve AC circuit problems involving sinusoidal steady-state, resonance, and power factor using phasor techniques. KLO1 [1]
3. Evaluate transient responses of RL, RC, and RLC circuits using experimental and simulation-based approaches. KLO3 [6]
4. Compare theoretical expectations with experimental results to validate AC and transient circuit behaviors. KLO4
5. Communicate experimental findings and technical observations through structured lab reports. KLO8 [3]

3) Course Contents

1. AC circuits analysis–resonant circuits – selectivity, Q factor, half power frequencies.
2. Transients- steady state and transient state response, response to R-L, R-C & RLC circuit under DC condition.
3. Three-phase systems- introduction to polyphase (three-phase) AC systems, advantages of polyphase system over single-phase system. relations between line and phase value of voltages and currents for star and delta connections and phasor diagram, power in polyphase circuits.
4. Coupled circuits- self-inductance and mutual inductance, conductively coupled circuit and mutual impedance, dot convention, coefficient of coupling, series and parallel connection of coupled inductors.
5. Filters- classification of filters, filter networks, classification of passband, stopband and cut-off frequency.

4) Lab Contents:

1. Introduction to Three Phase circuits AC Circuits using the Oscilloscope, Function Generator
2. Power Factor measurements and improvement
3. Transient response in R-L and R-C Network: Simulation/hardware
4. Transient response in R-L-C Series & Parallel circuits Network: Simulation/hardware
5. Frequency response of LP, BP, BR and HP filters
6. Resonance in series RLC circuit.
7. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits

5) Teaching Methods:

- Lectures and Discussion
- Videos
- Self-learning
- Laboratory demonstrations

6) Mode of Evaluation:

Course Assessment Methods

- Quizzes and assignment
- Major Exams
- Final Exam
- Lab Work

Evaluation

- **Semester Work**
  - Major Exams 30%
  - Quizzes 5%
  - Assignments 5%
  - Lab/Tutorial 20%
- **Final**
  - Paper work 40%

7) Textbook(s):

- Electric Circuits, James W. Nilsson and Susan A. Riedel, Addison Wesley, 6th edition.

Lab Manual

8) References:

- Engineering Circuit Analysis (6th Edition), W. H. Hayt, J.E. Kemmerly, and S. Durbin.
- Electronic Devices and Circuit Theory (7th ed.) by R. Boylestad and L. Nashelsky.