| Fall 2021 EEL3112 | Advanced Circuits with Computers | College of Engineering (CoE) A-105 Mon/Wed, 11:00 AM – 12:15 PM |
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Instructor: Prof. Jinyeong Moon
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Schedule: Class
    Mon/Wed 11:00 AM – 12:15 PM @ CoE A-105
Office Hours
    Mon/Wed 10:00 AM – 11:00 AM @ CoE B-368

## Course Objectives

Upon the completion of this course, the student will be able to:

(1)    Calculate the average power absorbed by an element in an AC circuit
(2)    Identify the relationships between the phase voltages, line voltages, the phase currents, and the line currents of a three-phase circuit.
(3)    Calculate average power absorbed by a balanced three-phase load.
(4)    Derive the transient response of a first-order circuit and of a second-order circuit.
(5)    Plot the transient response of an RLC circuit with a SPICE-based program.
(6)    Identify the characteristics of an ideal transformer.
(7)    Introduce the characteristics of a two-port network using two-port parameters.
(8)    Derive the transfer function of a RLC circuit.
(9)    Construct the Bode plots for a given transfer function.
(10)    Plot the frequency response of an RLC circuit with a SPICE-based program.

## Course Topics

(1)    Review of AC Steady-state Circuit Analysis
(2)    Steady-state Power Analysis
(3)    Transient and Forced Response of RL, RC, and RLC Circuits
(4)    3-phase AC Circuits with an Introduction to Transformers
(5)    Frequency Response of Linear Circuits
(6)    Circuit Simulation using Computers (PSPICE or MATLAB)
(7)    Introduction to Two-port Networks

## Course Textbook

[Required] Basic Engineering Circuit Analysis, 11th Edition, J. David Irwin and R. Mark Nelms

## ABET Student Outcomes

H (The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.). The assessment tool is a research paper on a contemporary topic related to global and societal problems and how the advancements in electrical and computer engineering are helping in solving these problems.

## Grading

The final grade is determined by the overall performance score:
A = 90 ~ 100; B = 80 ~ 89; C = 70 ~ 79; D = 60 ~ 69; F = < 60

The performance score considers:
Homework (20%), Midterm Exam (30%), Final Exam (40%), and Research Report (10%).

Homework assignments will be issued throughout the semester. The homework is due before the class on the due date. Late submissions are not accepted.

## Policy Statements

- First day attendance is mandatory for FSU students, and first week attendance is mandatory for FAMU students. Students not in class during the first day (FSU) or first week (FAMU) should be dropped from the course. This is a Title IV requirement involving federal financial aid. However, a student dropped from the course **may** re-register for it.
- There is no makeup exam without a certified medical excuse or prior instructor approval. The corresponding exam score will be automatically zero.
- There is no makeup quiz without a certified medical excuse or prior instructor approval. The corresponding quiz score will be automatically zero.
- In the event of an excused absence for exams and quizzes, consult the instructor prior to the exam to discuss proper procedure.
- Electronic devices, including a **cellphone**, should not disrupt the lecture (**no sound, no vibration**).
- There will be no phone conversations and text messaging during class.
- Profanity as well as ethnic, racial, or sexual remarks in my class will not be tolerated and will result in a reduction in your grade.
- Grade dispute must be made within one week after the graded work has been returned to the student. The student will have the burden of proof to show why the student is correct.

## Academic Honor Code

Students are bound by their university's Academic Honor Code and are subject to sanctions if they are found in violation of the Code. Possible sanctions include but are not limited to: (1) a failing grade on an exam or assignment; (2) a failing grade in the course; (3) dismissal from the academic program; or (4) dismissal from the university.

**Americans with Disabilities Act**

Students with disabilities needing academic accommodation should:

(1) Register with and provide documentation to the appropriate university office.
    For FAMU students, this is the Learning Development and Evaluation Center (LEDC).
    For FSU students this is the Student Disability Resource Center (SDRC); and
(2) Bring a letter to the instructor indicating the need for accommodation and what type. This should be done during the first week of class.


**Syllabus Change**

Except for changes that substantially affect implementation of the grading policy or grading scale, the syllabus is a guide for the course and is subject to change with advance notice.

| Date | Day | Lecture | Topics | Textbook Chapters | Homework |
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| 08/23 | Mon | 1 | Steady State Analysis | Chapter 8 | |
| 08/25 | Wed | 2 | Complex Numbers | Chapter 8 | HW1 Out |
| 08/30 | Mon | 3 | Steady State Power Calculations | Chapter 9 | |
| 09/01 | Wed | 4 | Steady State Power Calculations | Chapter 9 | HW1 Due & HW2 Out |
| 09/06 | Mon | | Labor Day - No Class | | |
| 09/08 | Wed | 5 | Steady State Power Calculations | Chapter 9 | |
| 09/13 | Mon | 6 | Magnetically Coupled Circuits | Chapter 10 | HW2 Due & HW3 Out |
| 09/15 | Wed | 7 | Transformers | Chapter 10 | |
| 09/20 | Mon | 8 | Transformers | Chapter 10 | HW3 Due & HW4 Out |
| 09/22 | Wed | 9 | Three-phase Circuits | Chapter 11 | |
| 09/27 | Mon | 10 | Three-phase Circuits | Chapter 11 | |
| 09/29 | Wed | 11 | Three-phase Circuits | Chapter 11 | HW4 Due |
| 10/04 | Mon | | Review for Midterm Exam | | |
| 10/06 | Wed | | Midterm Exam | | |
| 10/11 | Mon | 12 | First Order Circuits | Chapter 7 | |
| 10/13 | Wed | 13 | First Order Circuits | Chapter 7 | HW5 Out |
| 10/18 | Mon | 14 | First Order Circuits | Chapter 7 | |
| 10/20 | Wed | 15 | Second Order Circuits | Chapter 7, 12 | |
| 10/25 | Mon | 16 | Second Order Circuits | Chapter 7, 12 | HW6 Out |
| 10/27 | Wed | 17 | Second Order Circuits | Chapter 7, 12 | Preliminary Research Report Due |
| 11/01 | Mon | 18 | Second Order Circuits | Chapter 7, 12 | HW5 Due |
| 11/03 | Wed | 19 | Frequency Selective Circuits | Chapter 12 | |
| 11/08 | Mon | 20 | Frequency Selective Circuits | Chapter 12 | HW7 Out |
| 11/10 | Wed | 21 | Frequency Selective Circuits | Chapter 12 | |
| 11/15 | Mon | 22 | Frequency Selective Circuits | Chapter 12 | HW6 Due |
| 11/17 | Wed | 23 | Bode Diagram | Chapter 12 | |
| 11/22 | Mon | 24 | Bode Diagram | Chapter 12 | |
| 11/24 | Wed | | Thanksgiving - No Class | | |
| 11/29 | Mon | 25 | Two-port Networks | | HW7 Due |
| 12/01 | Wed | | Review for Final Exam | | Final Research Report Due |
| 12/06 Mon - 12/10 Fri | | | Final Exam Week | | Ver. 08/10/2021 |