Minnesota State College Southeast

ELEC 2505: Advanced DC/AC Circuit Analysis

A. COURSE DESCRIPTION

Credits: 3

Lecture Hours/Week: 2

Lab Hours/Week: 2

OJT Hours/Week: *.*

Prerequisites: None

Corequisites: None

MnTC Goals: None

This course provides the advanced understanding of DC and AC circuits needed for transition to an Engineering degree. Topics include, but are not limited to: Phasor analysis of AC series, parallel, and series-parallel circuits. Determine equivalent circuits using, Superposition, Thevenin, and Norton. Determine a circuit load impedance for maximum power transfer. Ideal transformers, along with balanced and unbalanced three-phase circuits will also be addressed. (Prerequisites: ELEC 1202 Intro to DC, 2cr; ELEC 1204 Intro to AC, 2cr; ELEC 1209 DC Theory and Circuits 2cr.) (3 credits: 2 lecture/1 lab)

B. COURSE EFFECTIVE DATES: 05/09/2017 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

1. Analyze circuits using network theorems
2. Analyze AC circuits using phasors
3. Define maximum power transfer
4. Analyze three-phase circuits
5. Create technical documentation

D. LEARNING OUTCOMES (General)

1. Express alternating current sinusoidal signals in the time domain and in the phasor domain mathematically
2. Explain reactance and impedance of an ideal resistor
3. Explain the DC and AC characteristics of an ideal inductor and ideal capacitor
4. Analyze an AC series circuit using phasors
5. Analyze an AC parallel circuit using phasors
6. Analyze an AC series-parallel circuit using phasors
7. Analyze multiple-source AC circuits using superposition
8. Determine complex power in an AC circuit containing reactance
9. Analyze DC and AC circuits using nodal analysis techniques
10. Ensure proper usage of laboratory equipment during circuit measurements and troubleshooting
11. Determine the Thevenin equivalent circuit for a given DC or AC circuit
12. Determine the Norton equivalent circuit for a given DC or AC circuit
13. Determine the load impedance for maximum power transfer between source and load
14. Analyze AC circuits that contain ideal transformers
15. Analyze balanced and unbalanced three-phase circuits
16. Demonstrate proper use of DC and AC electronic instrumentation in the laboratory
17. Create technical documentation
18. Exhibit safe work practices

E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

None

F. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus

G. SPECIAL INFORMATION

None noted