Minnesota State College Southeast

ELEC 2510: Advanced Electronic 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 focuses on development of equations for the analysis of frequency response of passive filters, RLC components, and various semiconductor devices, and circuits. These include diodes, bipolar transistors and field effect transistors. Circuit analysis will include the use of first order Bode plot graphs to measure the frequency response of different filters, bias and mid-band analysis of single stage BJT and FET amplifiers. Lab work includes analysis, computer simulation and actual measurements. (Prerequisites: Solid State Devices and Advanced DC/AC Circuit Analysis) (3 credits: 2 lecture/1 lab) NOTE: Learning outcomes stated herein. Processes for their implementation can be found in an expanded document at www.southeastmn.edu//WorkArea/DownloadAsset.aspx?id=9139.

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

C. OUTLINE OF MAJOR CONTENT AREAS

1. Proper use of DC and AC lab equipment. Analysis of AC excited RLC circuits
2. Explain circuit operation from the magnitude and phase Bode plots for RL and RC circuits
3. Identify the filter type from the magnitude Bode plot
4. Perform calculations using proper math and engineering notation
5. Utilize word processing, spread sheet, and circuit analysis software
6. Communicate technical information effectively, both written and orally

D. LEARNING OUTCOMES (General)

1. Analyze first-order Resistor-Inductor (RL) and Resistor-Capacitor (RC) Alternating Current (AC) circuits
2. Develop the transfer function into Bode form for Resistor-Inductor (RL) and Resistor-Capacitor (RC) circuits
3. Generate magnitude (in dB) and phase Bode Plots from a transfer function in Bode form
4. Explain the Bode plot response of first-order low-pass and high-pass filters from the transfer functions
5. Characterize the response of Resistor-Inductor-Capacitor (RLC) resonant circuits, both series and parallel
6. Determine Direct Current (DC) bias performance of linear transistor amplifier circuits
7. Determine AC mid-band performance for BJT and FET linear transistor amplifier circuits
8. Design first-order filters, resonant circuits, and linear transistor amplifiers in guided exercises from given specifications
9. Execute measurement test plan of filters, resonant circuits, and linear transistor amplifiers
10. Ensure proper usage of laboratory equipment during circuit measurements and troubleshooting

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

None

F. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus

G. SPECIAL INFORMATION

None noted