Miami Dade College

GENERAL INFORMATION	
Course Prefix/Number: EET3716C	Course Title: Advanced System Analysis
Number of Credits: 4	
Degree Type	☐ B.A. ☐ B.S. ☒ B.A.S ☐ A.A. ☒ A.S. ☐ A.A.S. ☐ C.C.C. ☐ A.T.C. ☐ V.C.C
Date Submitted:	Effective Year/Term: 2009-2
☒ New Course Competency ☐ Revised Course Competency	
Course to be designated as a General Education course (part of the 36 hours of A.A. Gen. Ed. coursework): ☐ Yes ☒ No	
The above course links to the following Learning Outcomes: ☐ Communication ☒ Numbers / Data ☒ Critical thinking ☐ Information Literacy ☐ Cultural / Global Perspective ☐ Social Responsibility ☐ Ethical Issues ☒ Computer / Technology Usage ☐ Aesthetic / Creative Activities ☐ Environmental Responsibility	
Course Description This is an upper division level course for students majoring in electronics engineering technology designed to prepare students to perform electrical circuit systems analysis using Laplace transforms and partial fraction expansion. Students learn theorems, frequency response and bode plots, and their application towards practical systems. Prerequisite: EET2101C. Co-requisite MAC2312. Laboratory fee. (2 hr. lecture, 4 hr. lab)	
Prerequisite(s): EET2101C	Co requisite(s): MAC2312

Course Competencies:

Competency 1: The student will demonstrate the ability to solve problems related to transient analysis of first order circuits by:

1. Defining a first order circuit.
2. Using differential equations to solve for any voltage or current in a first order circuit.
3. Describing the concepts of forced and natural solutions.
4. Computing and using the time constant in predicting instantaneous values.
5. Computing transient and steady-state solutions and investigating their respective waveforms.
6. Solving RC circuits.
7. Solving RL circuits.
8. Analyzing filters, including predicting breakpoints and roll off.

Competency 2: The student will demonstrate the ability to solve problems related to transient analysis of second-order circuits by:

1. Defining a second order circuit.

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Approved By Academic Dean Date: _____ Reviewed By Director of Academic Programs Date: _____

2. Using differential equations to solve for any voltage or current in a second order circuit.
3. Defining 2nd order differential equations.
4. Analyzing RLC circuits.
5. Computing the natural frequency and the damping ratio.
6. Designing a lowpass filter with a sharper cutoff than can be obtained with an RC circuit.
7. Discussing critical damping.

Competency 4: The student will demonstrate an understanding of circuit analysis using Laplace Transforms by**:**

1. Solving a differential equation.
2. Deriving the complex impedance for a capacitor.
3. Finding the transfer function from the impulse response.
4. Using the method of partial fraction expansion.
5. Mixing sines, cosines, and exponentials to solve equations.
6. Computing phase delay.

Competency 3: The student will demonstrate the ability to apply the transfer function by**:**

1. Using the transfer function to analyze of single-input single-output electronic filters.
2. Applying the transfer function to signal processing, communication theory, and control theory.
3. Defining linear time-invariant (LTI) systems.
4. Identifying the important characteristics of LTI systems.
5. Designing and modeling simple LTI systems and computing their transfer function in order to compare theoretical vs. practical systems.

Competency 5: The student will demonstrate the ability to perform frequency response analysis by **:**

1. Using Nyquist stability criterion to predict the stability and performance of a closed-loop system.
2. Computing gain margin.
3. Computing phase margin.

Competency 6: The student will demonstrate an understanding of Bode plots by**:**

1. Drawing and interpreting Bode magnitude plots and Bode phase plots.
2. Expressing power ratios in deciBels and decibels in power ratios.
3. Predicting gain and phase margin.
4. Calculating bandwidth frequency.
5. Analyzing closed loop response.