EGM 4045 – ELECTRO-MECHANICAL DEVICES
Common Course Syllabus

Catalog Description: (3 Credit hours) Introduction to basic DC and AC circuits; passive and active filtering; DC and AC motors; and Arduino micro-controller for hardware and software interfaces.

Goals: Introduction to basic DC and AC circuits; passive and active filtering; DC and AC motors; and Arduino micro-controller for hardware and software interfaces

Prerequisites:
1. Engineering Mathematics I – MAP 3305 or Differential Equations – MAP 2302
2. Physics for Engineers II – PHY 2044
3. C for Engineers – EEL2161C or Computer Applications in Eng 1 – EGN 2213

(all with a grade of C or above).

Topics:
1. Characteristic of resistance, inductance and capacitance components.
2. Serial and parallel connections of components.
3. Analysis of circuits using Kirchhoff's laws and Ohm's law
4. DC and AC circuits using nodal and mesh analyses
5. Transient responses in RLC circuits
6. Sinusoids and phasors in AC circuits
7. Frequency response analysis in AC circuits
8. Basic characteristics of AC and DC motors
9. Basic Arduino hardware and software interfaces
10. Signal filtering

Course Outcome: (numbers in parentheses indicate the correlation of the outcome with the appropriate ABET program outcomes 1-7)
1. Students will be able to analyze DC circuits with multiple sources. (1)
2. Students will be able to analyze transient responses in RL, RC, and RLC circuits. (1)
3. Students will be able to use phasors to analyze frequency response and its applications. (1)
4. Students will understand the basic principles of AC and DC motors. (1)
5. Students will be able to analyze and implement simple passive and active filters. (1)
6. Students will be able to implement hardware and software interfaces for simple sensors. (6)

Students will be able to implement hardware and software interfaces for DC motors. (6)

Design Content:
This course has a term design project. Seven lab sessions are provided so students gain hands-on experience and apply it to the project.

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