

Course Outline for: ENGR 2115 Introduction to Analog & Digital Electronics**A. Course Description**

1. Number of credits: 5
2. Lecture hours per week: 4
Lab/Studio/Clinical hours per week: 2
3. Prerequisites: ENGR 2016 (C or higher) or instructor consent
4. Co-requisites: None
5. MnTC Goals: None

This course introduces techniques for transient and switching circuit analysis. Topics include: MOSFETs as amplifiers and switches; a continuation of Fourier series; Laplace transform and applications; transfer functions and frequency response; relationship between Fourier and Laplace techniques; complete response of active, first- and second-order filters. Laboratory includes experiments with active electronic filters.

B. Date last reviewed: December 2020**C. Outline of Major Content Areas:** MOSFETs as amplifiers and switches; Fourier and Laplace techniques for circuit analysis; transfer functions and frequency response; complete response of active, first- and second-order filters, emphasizing audio applications.**D. Course Learning Outcomes**

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

1. Analyze simple MOSFET amplifier and switching circuits.
2. Analyze signals and linear circuits using Fourier series.
3. Analyze linear circuits and systems using Laplace transform.
4. Analyze, simulate, and construct frequency-selective *RLC* and op-amp circuits.
5. Describe the steady-state and transient behavior of active filters in terms of their complex frequency response.

E. Methods for Assessing Student Learning: Evaluation methods are at the discretion of the instructor and may include exams, quizzes, homework, projects, and labs.**F. Special Information:** To assist our transfer partner engineering programs in their ABET accreditation evaluations, this course teaches skills that help students achieve the following 2020–2021 ABET student outcomes:

- Outcome 1. an ability to identify, formulate, and solve complex engineering problems by applying principles of

- engineering, science, and mathematics
- Outcome 3. an ability to communicate effectively with a range of audiences
 - Outcome 5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
 - Outcome 6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
 - Outcome 7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.