Common Course Outline for: ENGR 2301 Digital Logic Design A

A. Course Description

1. Number of credits: 2 (half semester course)
2. Lecture hours per week: 3 (half semester course)
   Lab hours per week: 2 (half semester course)
3. Prerequisites: MATH 1510 Calculus 1 (C or higher) or concurrent enrollment
4. Co-requisites: None
5. MnTC Goals: None

This is the first half of an introduction to digital logic design. It is recommended for mechanical, aerospace, computer, and electrical engineering students. Topics include Boolean algebra, logic gates, Karnaugh mapping, and analysis and design of combinational-logic circuits. This course meets the first half of the semester.

B. Date last revised: April 2017

C. Outline of Major Content Areas: Number Systems, Boolean Algebra, Karnaugh Maps, NAND and NOR gate networks, gate conversions, Combinational Logic.

D. Course Learning Outcomes

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

1. Perform basic arithmetic operations in various number systems.
2. Apply basic Boolean postulates to simplify Boolean expressions.
3. Apply Karnaugh maps to simplify Boolean expressions.
4. Analyze and design various combinational logic circuits such as adders, subtractors, comparators, decoders, multiplexers and logic arrays.

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:

Relationship to ABET Accreditation Criteria: To assist our transfer partner engineering programs in their ABET accreditation evaluations, this course teaches skills that help students achieve the following ABET outcomes:

(a) An ability to apply knowledge of mathematics, science, and engineering
(b) An ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political ethical, health and safety, manufacturability, and sustainability
(e) An ability to identify, formulate, and solve engineering problems
(g) An ability to communicate effectively
(i) A recognition of the need for, and an ability to engage in, life-long learning
(k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.