1. *Course number and name*
   ENGR 357: Digital Design Laboratory
2. *Credits and contact hours*
   1 credit hour; one 2 hours and 45-minute lab session/week

3. *Instructor's or course coordinator's name*
   Instructor: Hamid Shahnasser, Professor of Electrical and Computer Engineering
   Course coordinator: Hamid Shahnasser, Professor of Electrical and Computer Engineering

4. *Text book, title, author, and year*
   M. Morris Mano & Michael D. Ciletti, Digital Design with an Introduction to the Verilog HDL, Fifth Ed

   a. *other supplemental materials*
      Hu, S. C., Computer Logic Experiments. Second Edition
      One Engr 357 Kit for each lab team (no more than 2 students/team); take voucher to pay $34 for kit at Bursar's Office (Adm 155); pick up kit at SCI-140 with receipt from Cashier.

5. *Specific course information*
   a. *brief description of the content of the course (catalog description)*
      CMOS digital circuits and their electrical properties, Sequential and Combinational circuits design and implementation, Hands on experiments on Adders, Decoders, Latches Flip-flops, Register and Counters. Introduction to EDA tool and VHDL programming.
   b. *prerequisites or co-requisites*
      ENGR 205 or CS210 with a grade of C- or better
   c. *indicate whether a required, elective, or selected elective course in the program*
      Required for Electrical Engineering; elective for Computer Engineering.

6. *Specific goals for the course*
   a. *specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic.*
   - The student will demonstrate an ability to analyze combinational and sequential circuits.
   - The student will demonstrate an ability to design and implement combinational and sequential circuits.
   - The student will demonstrate knowledge of structural, dataflow, and behavioral modeling of digital system
   - The student will demonstrate knowledge of VHDL (VHSIC Hardware Description Language) using Xilinx Software for circuit design.
   - The student will demonstrate the skill of using software tools.

   b. *explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.*

Course addresses ABET Student Outcome(s): a, b, c, e, k.

7. *Brief list of topics to be covered*
   - Basic Logic Operations
   - Introduction with EDA tool
   - Introduction and implementation of Combinational Circuit Design
   - Implementation of iterative circuits such as Adders and Subtractors
   - Implementation of Decoders and Multiplexers.
   - Introduction of Latches and Flip-flops
   - Introduction and implementation of Sequential Circuit Design
   - Implementation of Registers
   - Implementation of Counters