1. **Course number and name**

   ENGR 356 Digital Design

2. **Credits and contact hours**

   3 credit hour; Three 50-minute lecture 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. References**

   3. Daniels, J., Digital Design from Zero to One.

5. **Specific course information**

   **a. brief description of the content of the course (catalog description)**

   Number systems. Design of combinational and sequential logic circuits. Digital functional units such as adders, decoders, multiplexers, registers and counters. Micro-operations and register transfer language. Instruction format and execution. Memory organization. Datapath, control Units, Computer I/O and peripheral devices, time permitting.

   **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 combinational and sequential circuits.
      • The student will demonstrate the skill of using software tools.
      • The student will demonstrate an ability to implement Digital Design circuit as a course project.
   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, e, i, j, k.

7. Brief list of topics to be covered
   • Digital Systems and Binary information
   • Boolean Algebra and Logic Gates
   • Gate Level minimization
   • Combinational logic
   • Synchronous Sequential Logic
   • Registers and Counters
   • Memory and Programmable Logic
   • Design at Register Transfer Logic
   • Additional Topics, time permitting