EECS 140/141
Introduction to Digital Logic Design

Credits and Contact Hours:	4 hours of credit 3 hour lecture, 2 hour lab per week
Instructor:	Dr. David O. Johnson
Text:	*Introduction to Digital Logic Design (EECS 140),* By Swapan Chakrabarti, David Petr, and Gary Minden, Mcgraw Hill Create, 2017, ISBN-10: 1308221010, ISBN-13: 9781308221014
Catalog Listing:	An introductory course in digital logic circuits covering number representation, digital codes, Boolean Algebra, combinatorial logic design, sequential logic design, and programmable logic devices. EECS 141 is an honors course. EECS 141 students will have more challenging lab assignments.
Corequisite:	MATH 104 (Pre-calculus)
Required/Elective:	Required for Electrical Engineering, Computer Engineering, Computer Science, and Interdisciplinary Computing Grade of C required to progress
Course Outcomes:	Students should be capable of: 1. Representing a combinational logic function as a truth table, Boolean expressions including various canonical forms, and logic circuits, and translating between these representations. 2. Translating a simple logic problem expressed in prose to a combinational logic function. 3. Simplifying a combinational logic function using K-maps and other techniques. 4. Converting numbers between decimal and binary (and related) forms and designing simple digital circuits to perform numerical arithmetic functions. 5. Designing combinational circuits using common building blocks. 6. Designing flip-flop, register, and counter circuits. 7. Implementing simple finite state machines from written specifications. 8. Writing VHDL code for simple digital circuits.

Student Outcomes: (ABET):

(a) An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.

Course Topics:

1. Boolean Algebra and Logic Gates
2. Number Representation and Binary Arithmetic
3. Combinational Circuits
4. Implementation Technologies for Logic Gates
5. Latches and Flip-Flops
6. Sequential Circuits and Finite State Machines
7. VHDL for Combinational and Sequential Circuits

Prepared By: Dr. David O. Johnson Date: Fall 2018