Outcomes Based Learning Matrix

Course: ENGT 114 Digital Circuits Department: Electrical Engineering

Course Outcomes	Outcome Activities	Assessment Tools
Students will be able to:		
Demonstrate knowledge of the binary number system and conversions to different based systems. (WC, QL, IL, CCT, Int L)	Learn the binary number system, how to convert from binary to commonly used number-based systems such as bases 8, 10, and 16. Understand the role of binary in terms of the computer language and its relationship to digital circuits.	Students will learn this material through lectures and reading assignments and their understanding will be evaluated through homework assignments and exams.
Illustrate a thorough knowledge of Boolean algebra and its relationship to basic logic gates. (WC, QL, IL, CCT, Int L)	Learn the basis theorems of Boolean algebra and how to use Boolean algebra to simplify Boolean equations and how this relates to circuit minimization. Develop the Canonical and Standard forms of the equations and to represent Boolean expression as functions.	Students will learn this material through lectures, labs, and reading assignments. Student understanding will be evaluated through homework assignments and exams and performance with circuits in the lab.
Apply Product-of-Sums simplification, gate level minimization, and build truth tables for simple logic combinations. (WC, QL, IL, CCT, Int L)	Student will learn to use the Karnaugh mapping method to simplify Boolean expressions with up to 4 variables. They will lean to develop truth tables of complex combinatorial functions and use K-maps to write simplified Boolean expressions. They will also learn to express logic as two-level NAND or NOR implementations.	Students will learn this material through lectures, labs, and reading assignments. Student understanding will be evaluated through homework assignments and exams and performance with circuits in the lab.
Evaluate commonly used complex combinational circuits. (WC, QL, IL, CCT, Int L)	Student will learn about the functionality of adder circuits and be able to implement a binary and BCD adder. Students will also learn how multipliers are implemented as well as decoders, encoders, multiplexers, and three state logic gates.	Students will learn this material through lectures, labs, and reading assignments. Student understanding will be evaluated through homework assignments and exams and performance with circuits in the lab.
Analyze sequential logic circuits. (WC, QL, IL, CCT, Int L)	Students will learn to distinguish between time and event driven logic circuits. Beginning with the Latch and flip-flop students will learn the principles of data storage and time dependent logic circuits and how to derive state equations and diagrams of clocked sequential circuits.	Students will learn this material through lectures, labs, and reading assignments. Student understanding will be evaluated through homework assignments and exams and performance with circuits in the lab.