Electrical and Computer Engineering 2
(Digital Logic Circuits)
Curriculum Map

Textbook: Mano, M. and Ciletti, M., *Digital Design (With an Introduction to the Verilog HDL)* (2013), 5th Edition.

TOPICS	Duration	Month(s)
Chapter 1: Digital Systems and Binary Numbers Digital Systems, Binary Numbers, Number-Base Conversions, Binary Addition, Binary Subtraction, Binary Multiplication, Binary Division, Octal, Hexadecimal, One's Complement, Two's Complement, Diminished Radix Complement, Radix Complement, Signed Binary Numbers, Binary Coded Decimal, ASCII Character Code, Parity, Error-Detecting Codes, Binary Logic, AND/OR/NOT Logic Gates, Graphical Representation of Logic Gates, Truth Tables	4 wks	Jan - Feb
Chapter 2: Boolean Algebra and Logic Gates Boolean Algebra Definitions and Axioms, Boolean Algebra Theorems and Properties, DeMorgan's Theorem, Boolean Equations and Functions, Complements of Functions, Algebraic Manipulation of Boolean Expressions, Minterms, Maxterms, Sum of Minterms, Product of Maxterms, Canonical Forms, Conversion Between Canonical Forms, Standard Forms, NAND/NOR, Exclusive OR, Extension to Multiple Inputs	3 wks	Feb
Chapter 3: Gate-Level Minimization Karnaugh Mapping, Prime Implicants, Sum of Products (SOP) Simplification, Product of Sums (POS) Simplification, Don't Care Conditions, NAND/NOR Implementation, Hardware Description Language (Verilog)	3 wks	Feb - Mar
Chapter 4: Combinational Logic Analysis and Design Procedures, Binary Adder, Binary Subtractor, Decimal Adder, Binary Multiplier, Decoders, Encoders, Multiplexers, Verilog Implementation	3 wks	Mar - Apr
Chapter 5: Synchronous Sequential Logic SR Latch, D Latch, Flip-Flops, State Machines, Verilog Implementation, Applications	4 wks	Apr - May

Labs will be completed on the DE10-LITE FPGA board.

Students will learn to use the Quartus II software to create digital designs.