Course number: 04022170
Course name: Digital Logic Circuit
Prerequisites by course: General Physics II (11021202)
Prerequisites by topic: Students are assumed to have had sufficient background of the following topics: Numbering Methods, Basic Electric laws.
Credit hours: 3 hour
Contact hours: 3 hours
Textbook: [Computer Design], [Moris Mano], [Latest Edition]
References:

Course website: ---
Schedule and duration: 16 weeks, 16 Labs, 170 minutes each (including exams).
Minimum student material: class handouts, some instructor keynotes, calculator and access to a personal computer and internet.
Minimum college facilities: library, and computational facilities.
Course objectives: The objectives of this course are:

1.	Introduce students to digital principles and numbering systems
2.	Introduce students to basic logic gates
3.	Introduce students to logic design methods

Course outcomes and relation to ABET student outcomes: (matrix)
Upon successful completion of the course, a student should be able to:

Course Outcomes	Student Outcomes						
	SO1	SO2	SO3	SO4	SO5	SO6	SO7
To understand digital principles with emphasis on logic design.	*	*					
To get familiar with the necessary mathematical tools such as number systems, codes, and Boolean algebra.	*						*
To fully understand the principles of analysis and design of combinational logic circuits	*	*					
To be familiar with the principles of analysis and design of sequential logic circuits	*	*					*

Course topics:

Binary Numbers, Number Base Conversions

Octal & Hexadecimal Numbers, Complements, Signed Binary Numbers, Binary Codes
Binary Logic, Boolean Algebra: Axioms, theorems & Properties. Boolean functions, Digital Logic Gates
Canon. & Stand. Forms, More Logical Ops., Simp. of Bool. functions Using K-Maps, Prod. of Sums Simp.
Don't-care Cond., NAND, NOR, and other 2-Level Imp., X-OR Function, Introduction to HDL.
Subtractors, Decimal Adder, binary multiplier, Magnitude Comparator, Decoders.
Subtractors, Decimal Adder, binary multiplier, Magnitude Comparator, Decoders.
Encoders and Multiplexers, Random Access Memory.
Programmable Logic, PLD'S, ROM, Programmable Logic Array, Programmable Array Logic.
Sequential Circuits, Latches, Flip-flops, Characteristic Tables
Analysis of Clocked Sequential Circuits, State Reduction and Assignment.
Flip-flop Excitation Tables, Design Procedure, Synthesis using different flip flops.
Registers and Shift Registers
Ripple Counters, Synchronous Counters and other counters.

Computer usage: MatLab Software

Attendance: Class attendance will be taken every class and the university's policies will be enforced in this regard.

Assessments: Exams

Grading policy:

Participation	5%
Weekly Reports	15%
Midterm Exam	30%
Final Exam	50%

Instructors:

Student Outcomes (SOs)

1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3	An ability to communicate effectively with a range of audiences
4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies