Course Syllabus	**EECS 1100 Digital Logic Design**
Credits/Contact Hours	4 credit hours & 150 minutes lecture and 150 minutes lab contact hours per week.
Instructor's Name	Dr. Gursel Serpen
Textbook	Digital Design, 5/E,M. Morris Mano, Michael D. Ciletti, ISBN-10: 0132774208
Course Information	Number representation and Boolean Algebra. Combinational circuit analysis and design. K-map and tabulation methods. Multiplexers, decoders, adders/subtractors and PLD devices. Sequential circuit analysis and design. Registers, counters and recognizers. Prerequisite: None Elective or Required Course: Required.
Specific Goals - Student Learning Objectives (SLOs)	The student will be able to 1. Conduct an experiment to learn the logic design and prototyping process in order to acquire requisite hands-on skills and report the results through a well-defined and formatted written document. 2. Document the data acquired from an experiment, compare to the expected theoretical values and discuss any differences. 3. Design a digital module with combinational and sequential logic components to be able to address any problem in the applicable domain and report the results in a typical engineering design document. 4. Build a prototype of a digital logic circuit and demonstrate that it meets performance specifications, which are limited to functional correctness and resource minimization; i.e., minimal product-of-sums or sum-of-products only for combinational design. 5. Design an experiment to validate through empirical means one of the following: a hypothesis, a Boolean logic law or identity, dependency among variables, etc. Students will also be able to conduct the designed experiment, measure quantities of interest, collect and compile data, interpret the results and make engineering inferences. 6. Write an effective technical report for lab experiments.

7. Use state-of-the-art combinational and sequential logic design methodologies, techniques, and paradigms.
8. Use tools including a scope and a logic analyzer to prototype, debug and test a combinational and sequential logic circuit at the gate level utilizing the MSI/LSI technology.
9. Use online resources to obtain current literature on engineering components.

Topics

1. Number representation, number bases and base conversions, and binary codes
2. Boolean algebra and functions, canonical forms
3. Combinational design techniques: K-maps, tabulation method
4. Combinational logic circuits: adders/subtractors, code converters, comparators, multiplexors/demultiplexors, and decoders/encoders
5. Programmable logic circuits: read-only memory/programmable read-only memory (ROM/PROM), programmable logic devices (PLD), programmable logic arrays (PLA), and field programmable gate arrays (FPGA)
6. Sequential logic circuits

i. Latches and flip-flops,
ii. State behavior of synchronous sequential circuits: state tables
iii. Mealy-type and Moore-type sequential circuits
iv. Registers, counters, recognizers/sequence detectors and random-access memory (RAM)