

TECHNOLOGY 277: Digital Logic Design

2007-08 Catalog Data: TECH 277 Digital Logic Design (3 Credits)

Catalog Description: Design of digital circuits, using SSI, MSI, LSI, and VLSI components. Combinational design techniques as well as sequential design techniques are presented with the use of Karnaugh mapping, state transition diagrams and tables, and register transfer language.

Pre-requisite: Tech 175

Co-requisite: Tech 277A

Textbooks:

- Digital Fundamentals, Thomas L. Floyd, Ninth Edition, Prentice-Hall

Instructor: Dr. Abul K. M. Azad

Learning Objectives	Relational ABET Learning Outcomes
To examine the components of a digital system.	A. Mastery of knowledge, techniques, skills, modern tools of disciplines.
To examine the structures for various number systems.	A. Mastery of knowledge, techniques, skills, modern tools of disciplines.
To perform different binary arithmetic operations: addition, subtraction, 1's complement, 2's complement, and signed numbers.	A. Mastery of knowledge, techniques, skills, modern tools of disciplines.
To examine the operation and use of various logic gates with different input patterns: AND, OR, and NOT, NAND, NOR, XOR and XNOR.	A. Mastery of knowledge, techniques, skills, modern tools of disciplines.
To use Laws and Rules of Boolean algebra and DeMorgan's Theorems for manipulating Boolean expressions.	A. Mastery of knowledge, techniques, skills, modern tools of disciplines.
15. To evaluate the properties of Latches, Flip-Flops, and timers.	A. Mastery of knowledge, techniques, skills, modern tools of disciplines.
To distinguish the conversion methods for various number systems.	A. Mastery of knowledge, techniques, skills, modern tools of disciplines. B. Apply current knowledge and adapt to emerging applications of math, science, engineering, and technology.
To analyze the properties of fixed-function logic integrated circuits (IC): Complementary Metal Oxide Semiconductor (CMOS) and Transistor-Transistor Logic (TTL).	A. Mastery of knowledge, techniques, skills, modern tools of disciplines. B. Apply current knowledge and adapt to emerging applications of math, science, engineering, and technology.
To analyze the performance characteristics and parameters for logic gates and evaluate their significance in digital design.	F. Identify, analyze, and solve technical problems.
To analyze digital logic circuits using Boolean algebra.	A. Mastery of knowledge, techniques, skills, modern tools of disciplines. B. Apply current knowledge and adapt to

	<p>emerging applications of math, science, engineering, and technology.</p> <p>F. Identify, analyze, and solve technical problems.</p>
To examine the use of Flip-Flops in practical applications.	B. Apply current knowledge and adapt to emerging applications of math, science, engineering, and technology.
To design applications using the 555 Timer	C. Conduct, analyzes, and interprets experiments; apply experimental results to improve processes.
To analyze digital systems using combinational logic.	<p>C. Conduct, analyzes, and interprets experiments; apply experimental results to improve processes.</p> <p>F. Identify, analyze, and solve technical problems.</p> <p>I. Recognize the need for, and an ability to engage in life long learning.</p>
To evaluate combinational logic circuits for commonly used digital functionalities: Half-adders and full-adders, parallel binary adders, comparators, BCD to decimal decodes, BCD to 7-segment decoders, encoders, multiplexers, and demultiplexers.	<p>C. Conduct, analyzes, and interprets experiments; apply experimental results to improve processes.</p> <p>D. Ability to apply creativity in the design of systems, components, or processes appropriate to program objectives.</p> <p>F. Identify, analyze, and solve technical problems.</p> <p>I. Recognize the need for, and an ability to engage in life long learning.</p>
To design and study of counter applications using Flip-Flops.	<p>C. Conduct, analyzes, and interprets experiments; apply experimental results to improve processes.</p> <p>D. Ability to apply creativity in the design of systems, components, or processes appropriate to program objectives.</p> <p>F. Identify, analyze, and solve technical problems.</p> <p>I. Recognize the need for, and an ability to engage in life long learning.</p>
To design and study of various shift register applications.	<p>C. Conduct, analyzes, and interprets experiments; apply experimental results to improve processes.</p> <p>D. Ability to apply creativity in the design of systems, components, or processes appropriate to program objectives.</p> <p>F. Identify, analyze, and solve technical problems.</p> <p>I. Recognize the need for, and an ability to engage in life long learning.</p>

Expected Computer Usage: The students are expected to use MS Word and MS Excel for the preparation of homeworks, performance assessment deliverables, and laboratory reports.