

**MIAMI UNIVERSITY  
SCHOOL OF ENGINEERING AND APPLIED SCIENCE  
DEPARTMENT OF ENGINEERING TECHNOLOGY**

<b>ENT 293</b>	<b>Digital Switching</b>	<b>3</b>
Course Number	Title	Credit Hours

**DESCRIPTION:**

Principles and applications of digital systems. Emphasis placed on the study of combinational and sequential logic from a systems approach. Actual ICs are used as well as digital timing diagrams and waveforms.

**COREQUISITE:** MTH 125

**TEXT MATERIAL:**

- CD Text, Summers, Digital Fundamentals Supplement, Laboratories, and Application Exercises, OrchEd 2007
- Personal laboratory trainer, Circuit Lab Platform, OrchEd 2007

**REFERENCES:**

- Tocci, Digital Systems; Principles and Applications, 10th edition, Prentice Hall, 2004
- William Kleitz, Digital and Microprocessor Fundamentals, 9th edition, Prentice Hall, 2003
- McCalla, Digital Logic and Computer Design, Merril, Columbus, 1992
- Roth, Charles, Fundamentals of Logic Design, Third Edition, West, 1985
- Robert k. Dueck, Digital Design with CPLD Applications and VHDL, 2<sup>nd</sup> edition, Thomson Delmar learning, 2005

**COURSE OBJECTIVES:**

The student will gain a thorough understanding of Boolean algebra, basic storage devices, gating logic, counters, and serial-parallel converters. The student will be able to apply the concepts of digital analysis to industrial applications, and apply the digital concepts in wired and integrated electronic applications. The student will be able to design and analyze combinational logic and sequential logic circuits using gates, VLSI devices, and programmable logic devices. The student will gain a knowledge about the architecture of the modern computer and how its circuitry is realized using digital devices and digital design techniques.

**OUTCOMES:** After completing this course, students are expected to have an understanding of and ability to apply the following topics:

- Number systems, operations and codes
- Logic gates
- Boolean Algebra
- DeMorgan's theorem and logic simplification
- Combinational logic circuits
- Encoders/decoders
- Multiplexers/demultiplexers
- Adders, subtractors, ALUs
- Flip-flops and related devices
- Counters
- Shift registers
- Memory and storage
- Integrated circuit technologies
- Introduction to microprocessors, computers and buses

**MEETING PLACE AND TIME:**

Class meets one day per week for 3 hours and 40 minutes

**TOPICAL OUTLINE AND SCHEDULE:**

Week	Date	Topic	Homework	Lab Experiment
1		Module 1– Digital Concepts	1.1 thru 1.15	Build Circuit Trainers
2		Module 2– Number Systems	2.1 thru 2.14	Test Trainers
3		Module 3- Logic Gates	3.1 thru 3.10	Design a Maj. 3 Voter
<b>*Note: Chapter 3 Lecture &amp; Lab will be covered in one class period due to Labor Day</b>				
4		Module 4- Boolean & K maps DeMorgan's Theorem	4.1 thru 4.10	Auto Signal Light Syst.
5		Module 5- Combinational Logic Adders, subtractors, ALUs	5.1 thru 5.6	4 Bit Binary Full Adder
6		Module 6- Higher Ord. Devices Encoders/decoders	6.1 thru 6.8	Decoder/Muxer. Appls.
7		Module 7- Intro. to Prog. Logic	7.1 thru 7.5	GAL Dice Decoder
8		Module 8- Flip Flops & Memory	8.1 thru 8.8	Design a "D" Flip Flop
<b>8</b>	<b>Note: The mid-term exam will be given this week</b>			
9		Module 9- Asynchronous Cntrs. Shift Registers	9.1 thru 9.6	Asynchronous Counter
10		Module 10- Serial Data Trans.	10.1 thru 10.6	Serial Data Link
11		Module 11- State Machines	11.1 thru 11.3	Craps Game Design
12		Module 12- Memory Devices	12.1 thru 12.4	Phone No. Mem. Bank
13		Module 13- Analog to Digital Int.	13.1 thru 13.5	Digital Thermometer
14		Module 14- Basic Comp. Arch.	14.1 thru 14.2	ROM Controller Design
<b>*Note: There is only one class period this week due to the Thanksgiving break</b>				
15		Finish Module 14 – Comp. Arch.	14.3 thru 14.5	Finish ROM Controller
16		Review for final exam. – Course Evaluation – Final Exam.	Given	