Engineering Technology –ECET Option

Course Number and name: ET 182 Digital Logic

Credits & Contact Hours: 3cr. Each week has two lectures of 75 min. Total semester contact hours are approximately 45 hr.

Instructor's name: Thomas Jenkins

Textbook title, author, and year: *Digital Fundamentals, 10th ed., Floyd,* Prentice Hall, 2009; **References:** *TTL Logic Data Book Vol. II*

Specific Course Information:

a) **Course Catalog Description** - The use of truth tables, Boolean equations, and diagrams to define, simplify, and implement logic-valued functions.
b) **Prerequisite –** none
c) This course is required for both the ECET, MET, and IET degrees

Course Goals & Objectives:
To provide the student with introductory knowledge and skills relating to basic digital logic and electronic design and applications; to familiarize the electronic and computer engineering technology (ECET) students with a treatment of applied digital systems including small scale integrated devices; and to prepare the ECET students for courses in the next level of analysis and design of digital systems.

Related ABET Objectives and Outcomes: The department of Engineering Technology and Survey Engineering ECET option has an objective of having its graduates possess the following skills and knowledge.

1. An appropriate mastery of the knowledge, techniques, skills and the modern tools of their disciplines including:
    - **Digital circuit analysis and design techniques**, architecture and applications of microcomputer systems, and the building, testing, operation and maintenance of electronic and computer systems.
    - The use **of Boolean mathematics in support of** the analysis, design, and application of electronic systems.
2. An ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering and technology;

Course topics and lecture hours devoted to each topic:

TOPICS	**HRS.**
• Numeric representations - digital and analog systems	2
• Numbering systems: binary, octal, hex	1
• Converting between number systems	2
• BCD and ASCII codes	2
• Gates (AND, NOR, etc), truth tables, timing diagrams	4
• Alternate logic symbols, IEEE symbols	2
• Boolean and DeMorgans Theorems	2

- SOP equations and simplifications techniques 2
- Karnaugh Map simplification techniques 2
- Circuit diagrams and laboratory topics 2
- Miscellaneous topics 3
- Tests and Quizzes, Review, Problem Solving and Examples 8

Laboratory Projects: There is approximately five laboratory sessions per semester with each laboratory replacing a lecture class of 75 minutes. Laboratory exercises are done in conjunction with the text readings and the lecture materials. The laboratories are designed to apply the theory of the analysis with the application of the circuit. Students must take a problem specification, design a digital circuit, construct the circuit, and verify the design by testing with test and measurement equipment. A *formal* lab write-up is required by each group. **Equipment utilized by the students include (but is not limited to):** Digital Multimeters, Oscilloscopes, logic probes, Cadet designer boards (with built-in switches, LED's, function generators), Function generators and power supplies, Resistors, TTL logic gates and CMOS logic gates in a variety of families.

Example of topics for laboratories might include:

- Design, build, test, and document a digital logic circuit given a Sum-of-Products logic equation or truth table.
- Construct a J-K flip-flop with asynchronous inputs and a PGT clock input using NAND logic. Test the design against the Next-state tables for this device.

Prepared by: Thomas Jenkins **Date: 9/1/10**