The Engineering Technology Department, in cooperation with the Office of Disability Accommodation, complies with the Americans with Disabilities Act in making reasonable accommodations for qualified students with disabilities. Please present your written accommodation request to the instructor prior to the fourth day.

SAFETY CATEGORY: N

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DATE PREPARED: January 17, 2016
PREPARED BY: Elias Kougianos – elias.kougianos@unt.edu – http://engineering.unt.edu/technology/public/eliask/

COURSE NUMBER, TITLE AND CREDIT HOURS
ELET 5340, Digital Logic Design Techniques, 3

COURSE DESCRIPTION
Three semester credit hours. A study of the design, simulation, and implementation of digital logic circuits including combinational and sequential logic, algorithmic state machines, hardware test techniques, software used in design and simulation and an introduction to the use of the Verilog hardware description language. Oral and written documentation and presentations are required.

PREREQUISITES
Bachelor’s degree in engineering technology, engineering, computer science, physics, or consent of instructor.

CLASS VENUE:
Lectures are held on Mondays and Wednesdays 5:30 PM – 6:50 PM in B140 Discovery Park.

The course will be managed via UNT’s Blackboard Learn system:

https://learn.unt.edu

REQUIRED TEXTBOOKS

SUPPLEMENTAL TEXTS AND MATERIALS
Material provided during the course and/or available from the instructor's web site http://www.etec.unt.edu/public/eliask.

COURSE OBJECTIVES
1. Provide hands-on, high-involvement exercises, and computer software activities to introduce the use, capabilities, and limitations of software used in the design of digital electronic components.
2. Introduce students to sufficient terminology, reinforced with classroom applications, to support independent study following class completion.
3. Introduce the use of computers for the design, evaluation, and production of digital electronic circuits using integrated circuits and programmable logic devices (PLD).
4. Understand the Verilog language used to implement both combinational and sequential logic circuits.

**STUDENT LEARNING OUTCOMES (Course objectives supported)**

1. Differentiate between the types of electrical devices used to implement digital logic.
2. Create digital switching equations using Boolean algebra, numerical, graphical, and computer software.
3. Solve problems using truth tables, Karnaugh maps, state tables, and state diagrams.
4. Use software and analytical tools to solve combinational and sequential logic problems.
5. Create and analyze digital logic diagrams and Verilog programs for implementation of digital logic solutions in hardware.
6. Create and analyze Verilog programs for implementation of digital logic solutions in hardware.
7. Present and interpret knowledge of the technical contents of the course using oral and written techniques.
8. Demonstrate the ability to work individually and in teams on specific laboratory and project assignments.
9. Use various sources such as the Internet, library, professional literature, etc. to identify and use technical data.

**COURSE OUTLINE:**

1. Introduction – Design concepts and the design process.
2. Introduction to logic circuits.
3. Implementation technology.
4. Optimized implementation of logic functions.
5. Digital arithmetic.
7. Flip-flops, registers, counters and processors.
8. Synchronous sequential circuits.
9. Digital system design and CAD tools.

**COMPUTER USAGE:**

Students are required to prepare designs using computer aided engineering software; run design simulations; prepare reports; and conduct internet research on the computer and associated equipment.

This course provides opportunities for students to take advantage of one or more of several software packages supported by the department in the classroom or in lab experiments, in simulation studies, homework assignments, or in projects.

**COURSE EVALUATION**

The Student Perceptions of Teaching (SPOT) is a requirement for all organized classes at UNT. This short survey will be made available to you at the end of the semester,
providing you a chance to comment on how this class is taught. I am very interested in the feedback I get from students, as I work to continually improve my teaching. I consider SPOT to be an important part of your participation in this class.

**DISABILITIES ACCOMMODATION**
The University of North Texas complies with Section 504 of the 1973 Rehabilitation Act and with the Americans with Disabilities Act of 1990. The University of North Texas provides academic adjustments and auxiliary aids to individuals with disabilities, as defined under the law. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring accommodation, please see the instructor and/or contact the Office of Disability Accommodation at 940-565-4323 during the first week of class.

**LIBRARY USAGE:**
Library research assignments requiring a notebook/diary of entries showing dates, times, journals, books, internet resources, and other information researching activities may be required.

**INSTRUCTIONAL OBJECTIVES:**
(See learning outcomes.)

**LEARNING STRATEGIES**
- Lectures (Professor and Guests)
- Student Presentations
- Demonstrations
- Problem Sessions
- Laboratory Assignments
- Outside Reading and Projects
GRADING ELEMENTS AND WEIGHTS:

Examinations 100%
(2 exams, 30% each & final 40%)

A   >90%
B   80 – 89%
C   70 – 79%
D   60 – 69%
F    <59%

Examination schedule:
Test 1 – Wednesday, February 24, 5:30-6:50 PM in B140
Test 2 – Wednesday, April 6, 5:30-6:50 PM in B140
Final Exam – Monday, May 9, 5:30-7:30 PM in B140

GRADING POLICIES:
1. The student is required to attend all scheduled lectures. The student shall be dropped from the course for three (3) unexcused absences. An excused absence can only be guaranteed by obtaining, in advance, instructor authorization. A student shall be considered absent if twenty or more minutes late to class.

CLASS POLICIES:
1. All rules relating to academic dishonesty will be enforced in accordance with University policies.
2. State common law and federal copyright laws protect my lectures. They are my own original expression. Whereas you are authorized to take notes in class thereby creating a derivative work from my lecture, the authorization extends only to making one set of notes for your own personal use and no other use. You are not authorized to record my lectures, to provide your notes to anyone else or to make any commercial use of them without expressed prior permission from me.
3. This syllabus is subject to change at any time during the semester with changes to be announced in class.
4. Students should schedule at least one hour per lecture hour for study outside class.
5. Grades are based, in part, on the student's ability to communicate. Well written English is expected in all course work and is a factor in grading.
6. Each student should retain graded lecture notes, pop quizzes, homework, tests, and software-generated files, to document errors in recorded grades.
7. Requests for review of graded work must be submitted during the lecture in which such work is returned to the students. The request should be accompanied by a written justification of the request including any supporting data.
8. The UNT Catalog procedures on cheating and plagiarism will be vigorously enforced. It is the duty of all students to protect their work so it is not available to others for submission as their efforts. This is especially true of files that are generated on the computer. Students who knowingly allow others to use their work are partners in this unethical behavior.
9. There is no limit to the use of calculators for lecture, labs, pop quizzes, formal tests, or final examination.

10. Challenges to the course grade must be presented within 60 days of receipt of grade notices mailed by the university. This will insure that instructor’s records are still available to allow a review of the assigned grade. You should first discuss your complaint with the instructor. If you wish to carry it further, contact the Program Coordinator by calling (940) 565-2022. To further pursue your complaint, contact the Department Chair at (940) 565-2022, but ONLY after first discussing your concern with the previous two individuals.

11. If appropriate, Material Safety Data Sheets (MSDS) are maintained on file in the department for your review. Access to these documents may be provided by the:
   • instructor of this course,
   • Program Coordinator,
   • Department Secretary.

   Seek initial access through the instructor or Coordinator rather than the secretary.

12. Cheating on quizzes, examinations and laboratory assignments, and plagiarism on various papers and reports are types of disciplinary misconduct for which penalties are assessed under the UNT Code of Student Conduct and Discipline. Major responsibility for implementing the University's policy on scholastic dishonesty rests with the faculty. Be advised that the instructor of this course supports and fully implements this policy. The following actions will be taken when evidence of such misconduct is observed. The student will be presented with the evidence of misconduct and given an opportunity to explain same. Based on the outcome of this private conference, the matter will be either dropped or the student will be given a grade of "F" in the course and be referred to the Dean of Students for further counseling and/or disciplinary action.

13. An I (incomplete) grade is given only for extenuating circumstances and in accordance with University and Departmental Policies.