

## **ENPH/CS 2484 Introduction to Digital System Design**

**Department: Mathematics, Physics and Engineering**

**Credit Hours: 4**

**Required or Elective (circle one)**

### **Current Catalog Description:**

Combinational and sequential digital system design techniques; design of practical digital systems. Credit for both CS2484 and ENPH2484 will not be awarded.

### **Course Schedule:**

3 lecture hr/ wk, 3 lab hr/week

### **Textbook(s):**

### **Coordinator:**

Dr. Mircea Agapie

### **Course Web Page:**

### **Prerequisites by Topic:**

PHYS 2424 Principles of Physics II: Electricity and Magnetism, optics and modern physics (corequisite)

### **Course Grading:**

### **Course Learning Goals and Program Outcome Map:**

The Program Outcomes for Engineering Physics are:

- A. an ability to apply knowledge of math, engineering & science
- B. an ability to design and conduct experiments, as well as to analyze and interpret data
- C. an ability to design system, component or process to meet needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- D. an ability to function on multi-disciplinary teams
- E. an ability to identify, formulate, and solve engineering problems
- F. an understanding of professional and ethical responsibility
- G. an ability to communicate effectively
- H. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- I. a recognition of need for, and ability to engage in life-long learning
- J. a knowledge of contemporary issues
- K. an ability to use techniques, skills, and modern engineering tools necessary for engineering practice.
- L. a depth and breadth of knowledge in engineering and physics necessary to work in a multidisciplinary environment

<b>Course Goals</b>	<b>Program Outcome(s):</b>
Upon completion of this course, students will	
1. Be able to analyze and design combinational and sequential circuits at the gate/flip-flop level.	A, C, E
2. Understand the main real-life impediments to circuit design, and have a working knowledge of methods used to address those impediments.	A, C, E
3. Understand the main sources of optimization of circuits, and have working knowledge of a few optimization algorithms.	C
4. Be familiar with a dozen commercial, off-the-shelf SSI and MSI circuits, and know how to combine such circuits in practical applications.	C, L
5. Have practical experience with an industry-strength LSI/VLSI circuit (FPGA – lab).	K, L
6. Be able to clearly organize, document and present their analysis conclusions and design decisions, in order for their systems to be modular, and compatible w/existing and future systems.	D,G

**Topics (optional):**

<b>Topic</b>	<b># Lec/Lab (approx.)</b>
Number systems and codes for representing integers.	3/3
Boolean algebra and logic gates in general.	1/3
Structure and operation of CMOS gates.	1/0
Steady-state behavior of CMOS circuits, noise margins, non-ideal inputs, fan-out etc.	2/0
Dynamical behavior of CMOS circuits.	1/0
Other (to be determined)	
<b>Exams</b>	3/0

**Academic Honesty:**

Cheating, plagiarism (submitting another person's materials or ideas as one's own), or doing work for another person who will receive academic credit are all-impermissible. This includes the use of unauthorized books, notebooks, or other sources in order to secure or give help during an examination, the unauthorized copying of examinations, assignments, reports, or term papers, or the presentation of unacknowledged material as if it were the student's own work. Disciplinary action may be taken beyond the academic discipline administered by the faculty member who teaches the course in which the cheating took place.

**Students with Disabilities Policy:**

It is the policy of Tarleton State University to comply with the Americans with Disabilities Act (ADA) and other federal, state, and local laws relative to the provision of disability services. Students with disabilities attending Tarleton State University may contact the Office of Disability Services at (254) 968-9478 to request appropriate accommodation. Furthermore, formal accommodation requests cannot be made until the student has been officially admitted to Tarleton State University.

**Contribution of Course to Meeting the Professional Requirement:**

Engineering Topics: 100%

**Status of Continuous Improvement Review of this Course:**

**Prepared by:** *Mircea Agapie*

**Date:** *May 1<sup>st</sup> 2005.*

**Reviewed by:** *Denise Martínez*

**Date:** *May 18, 2005*

**Review Notes:**

Elaborate on topic coverage -- dmm