Introduction to Digital Systems, CSE 271  
Electrical, Computer, and Software Engineering  
Fall 2007

Instructor: Dr. Xuping Xu, Associate Professor of Electrical, Computer, and Software Engineering  
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Office and Office Hours: REDC 166, M:3:30-4:30PM, W:10AM-12PM, F:1:20-2:20PM, or appointment

Course Title: CSE 271, Introduction to Digital Systems, Required Course

Course Meeting Day, Time, and Location: MWF, 2:30PM -3:20PM, REDC 208

Course Description: Introduction to logic design and digital systems. Topics include Boolean algebra, and introduction to combinatorial and sequential circuit design and analysis.

Prerequisite: Concurrent: PHYS 202 or PHYS 212


Course Objectives: Upon successful completion of this course, students should understand the following:
1. How to convert between numbering representations.
2. How to design a combinational logic circuit from a word statement to a circuit diagram.
3. Be able to manipulate a logic function in any of its representations: word statement, truth table, symbolic expression, and circuit diagram.
4. How to determine $SOP_{\text{min}}$ and $POS_{\text{min}}$ realizations of logic functions with or without don’t cares.
5. How to use espresso to minimize logic functions.
6. How adders, comparators, multiplexers, and decoders are built and how they should operate.
7. How basic SR latch, gated SR latch, gated D latch, D flip-flop, T flip-flop, and JK flip-flop are supposed to operate.
8. How registers, shift registers, counters, and RAMs are built and how they should operate.
9. How to design finite state machines using a dense or one-hot encoding methods.
10. How to design complex digital systems using the datapath and control approach.

Topics Covered:  
Textbook Chapters
Binary number system 1
Boolean algebra and minimization of logic functions 2 & 3
Combinational logic design 4
Introduction to sequential circuits 5 & 6
Sequential circuit design 7
Datapath and control 8

Class/Laboratory Schedule: Lecture: 3hrs/week

Contribution of Course to Meeting Professional Component: Major sophomore level class that devotes adequate attention and time to the basics of digital systems and design. It helps to prepare students for more advanced computer-related courses.

Relationship of Course to Program Outcomes: This course addresses the following program educational outcomes: a, e, k, m, n, o, p

Prepared by and Date of Preparation: Xuping Xu, August 22, 2007
Course Webpage:  http://ecse.bd.psu.edu/cse271

Calendar/Dates:
Exam #1  Monday – 10/08  in class
Exam #2  Monday – 11/12  in class
Final Exam  To be announced  To be announced

Grading Criteria:
2 Exams  40%  (Exam #1: 20%, Exam #2: 20%)
Final Exam  30%
Assignments & Quizzes  30%

Grade Assignment:  A: 93-100; A-: 90-92; B+: 87-89; B: 83-86; B-: 80-82; C+: 76-79; C: 70-75;
D: 65-69; F: <65. These guidelines may be revised downward in favor of the students
during the course of the semester.

Attendance Policy:  Students are expected to be regular and punctual in class attendance. You are
responsible for all materials covered in class.

Makeup Policy:  Makeup for missed exams and quizzes will be allowed in the event of an illness or
emergency, but the instructor must be notified before the exam or quiz. There will be no makeups for
unexcused absences.

Assignments:  Problems will be assigned and collected. One or several problems will be selected and graded,
or a quiz based on the assignment will be given. Homework assignments are due at the start of the class
period. After they are graded, selected problems will be explained in class and solutions to other problems
will be posted. All assignments that are turned in should be neat and legible. In addition, assignments must
be turned in on engineering paper (available in bookstore) and stapled. Failure to do so will result in a grade
of zero on the assignment.

Late Policy:  Assignments turned in late (after the start of class) will be penalized 25 percentage points.
Assignments handed in more than 1 day late will NOT be accepted.

Academic Integrity:  Penn State Erie puts a very high value on academic integrity, and violations are not
tolerated. Academic integrity is one of Penn State’s four principles to which all students must abide. Any
violation of academic integrity will receive academic and possibly disciplinary sanctions, including the
possible awarding of an XF grade which is recorded on the transcript and states failure of the course was due
to academic dishonesty. All acts of academic dishonesty are recorded so repeat offenders can be sanctioned
accordingly.

I encourage students to help one another, but plagiarizing will not be tolerated in this course. You should be
able to explain to me every single detail of your solution to the problem. Both parties involved in the
plagiarizing case will receive zero points. Provable cases of cheating will be prosecuted to the fullest extent
allowable by the University and the Commonwealth of Pennsylvania. More information on academic
integrity can be found at:
http://www.pserie.psu.edu/faculty/academics/integrity.htm

References:  (24 hr reserve in the library)
  Hill Higher Education, 2005
Learning Resources: The Learning Resource Center provides the following tutoring services relevant to the course:

- Writing tutoring is available in the Learning Resource Center, 203 Lilley Library.
- Math tutoring is available in the Roche Annex (2nd floor Roche Hall).
- Engineering tutoring is available in the REDC, Room 240.
- Tutoring for other subjects and study skills is offered by appointment. Stop in at the Learning Resource Center.
- For more information go to: http://pennstatebehrend.psu.edu/academic/lrc/tutor.htm