

**EE 2274 Introduction to Digital Systems**  
Fall 2014, 3 Credits

**Textbook:** *Digital Design Principles and Practices*, 4<sup>th</sup> Ed., J. Wakerly, Prentice-Hall, 2006.  
ISBN 0-13-186389-4.

**Co-requisite:** EE 2275.

**Lectures:** Mon/Wed/Fri 11:00am – 11:50am, LIBR 16/CHE 303

**Catalog Description:** Number systems; Boolean algebra fundamentals; system reduction, combinational and sequential logic.

**Instructor:** Dr. Steve C. Chiu, Associate Professor of Electrical Engineering, email: [chiustev@isu.edu](mailto:chiustev@isu.edu), Office and Office Hours: LEL 214, Tue/Thu 11:00am – 1:00pm, or by appointment.

**Teaching Assistant:** Mr. Asif Ahmed, email: [ahmeasif@isu.edu](mailto:ahmeasif@isu.edu), Office Hours: Wed 3:00pm – 5:00pm.

**Grading:** Course grading will be distributed as follows: 1 midterm exam (20%), 5 written assignments (20%), 6 in-class quizzes (30%), and 1 final exam (30%). No make-up quizzes will be given. Absence from the midterm or final exam requires written physician's documentation. A maximum of 5% extra credit will be given for class attendance and participation. Written assignments will be graded based on correctness (90%) and presentation (10%).

**Hardware and Software:** The hardware (BASYS 2 FPGA board) and the software tools (ISE WebPack, Digilent Adept 2, and Active-HDL) are available from the following links.

**Digilent BASYS 2 (Select Academic Pricing):**

[www.digilentinc.com/basys2](http://www.digilentinc.com/basys2)

**Xilinx ISE Webpack (Install 14.7 Full Product Installation for Windows or Linux):**

<http://www.xilinx.com/support/download/index.html/content/xilinx/en/downloadNav/design-tools.html>

**Digilent Adept 2 (Windows or Linux):**

<http://www.digilentinc.com/Products/Detail.cfm?Prod=ADEPT2>

**Aldec Activ-HDL:**

[https://www.aldec.com/en/products/fpga\\_simulation/active\\_hdl\\_student](https://www.aldec.com/en/products/fpga_simulation/active_hdl_student)

**Late Policy:** If a written assignment cannot be submitted by the deadline, you must contact the instructor **before** the deadline to arrange a late submission. Otherwise, late submissions are not accepted. If a late submission is arranged, the penalty is 10% of the maximum points per delayed day. For example, an assignment that is 2 days late and would get 80 points out of 100 will receive  $80 - 100 * 10\% * 2 = 60$  points.

**Class Schedule (Selected Topics):**

August	Chapters 1, 2 (Introduction, Number Systems)
September	Chapters 3, 4 (Switching Algebra, CMOS/TTL)
October	Chapters 4, 6 (Combinational Circuits, K-maps)
November	Chapters 6, 7 (Buffer, Decoder, Encoder, MUX, Adder, Shifter)
December	Chapters 7 (Adder, Shifter, others)

**Midterm Exam** will be scheduled for mid October

**Final Exam** will be scheduled for Finals Week

**Course Learning Objectives** – these are objectives and concepts for the students to learn and retain, well after taking this class:

1. Students have knowledge about the basic elements of digital number systems and logic
2. Students have knowledge about the basic building blocks of digital systems

**ABET Student Outcomes** – these are specific learning skills that the students attain at the end of the course and that reflect the broader course objectives:

- c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

### **How to do well in this class:**

It will be necessary to memorize certain essential principles and devices and to practice with them. But memorization alone will not get you a good grade. You need to understand the concepts that we discuss in this class and be able to apply them. Exam questions will not always be based directly on homework problems. You will not be able to successfully prepare for the exams just the night prior to the exams.

Come to class, pay attention, ask questions, then review the material after each class, and work hard on the assignments. You will have copies of the class notes so that you can pay closer attention during class and not have to worry about taking notes. A few days before the exam, go over the notes and summarize them and spend time on your summary. Review the homework solutions also. The emphasis will be on understanding of concepts. I will specify any required references so they do not have to be memorized.

If you missed an exam, you must provide documentation justifying your absence, or you will receive a grade of zero on the exam. In case of illnesses, you must provide written documentation from your physician. There will be no make-up quizzes.

### **Accessibility Statement**

Our program is committed to all students achieving their potential. If you have a disability, or think you have a disability (physical, learning disability, hearing, vision, psychiatric) which may need a reasonable accommodation, please contact Disability Services located in the Rendezvous Complex, Room 125, 282-3599, as early as possible.

### **Academic Dishonesty Statement**

Academic dishonesty is unacceptable and will not be tolerated. Homework assignments and exams are designed to be educational, and the process of preparing for and completing them helps to improve your skills and knowledge. Actions such as cheating, forgery, plagiarism and collusion in dishonest acts are serious offenses that are inconsistent with this intent, and will significantly diminish the educational value of those experiences. Students who attempt to obtain unearned academic credentials not reflective of their own skills, abilities and knowledge can undermine the value of the ISU degrees earned by their more honest peers. ISU takes such offenses very seriously, and expects that all work you submit will be a result of your own original and independent efforts.

**Cheating** is the attempted or unauthorized use of materials, information, notes, study aids, technology or communication devices during an academic exercise.

**Forgery** involves making, adapting, or imitating objects, statistics, or documents with *intent* to deceive.

**Plagiarism** is the act of presenting another person's ideas, research or writing as your own. Even students who don't intend to plagiarize, but do so by mistake, can suffer undesirable consequences from their unintended action. It is not the *intent*, but only the *fact*, of plagiarism that will be taken into account.

**Collusion** is an agreement between two or more parties to deceive, mislead, or defraud others to obtain an objective or gain an unfair advantage.

You are expected to read and be familiar with the University's Policy on Student Conduct, located at: <http://www.isu.edu/policy/5000/5000-Student-Conduct-System.pdf>. If you are charged with an offense, pleading ignorance of these rules will not be acceptable.

***Practices that are acceptable include:***

- Getting procedural advice from consultants in the Content Area Tutoring Center.
- Discussing ideas about assignments with fellow students.
- Showing a classmate how to do a *similar* problem, or receiving help in this way.
- Getting help from your instructor.
- Modeling your solution directly after examples given to you by the instructor, or from course materials.
- Doing all of your work by yourself.

***Practices that are not acceptable include, but are not limited to:***

- Copying from another student during an exam or allowing another to copy from you.
- Unauthorized collaboration on a take-home assignment or exam.
- Using unauthorized notes or other resources during a closed-book exam.
- Using unauthorized electronic devices (e.g., cell phones, laptops) during an exam.
- Taking an exam for another student, or asking or allowing another student to take an exam for you.
- Changing a corrected exam or homework paper and returning it for more credit.
- Asking or expecting your instructor to change your grade "because you knew what you were doing, but didn't or couldn't show it on the exam."
- Asking your instructor to break rules for you in a manner not applied to everyone else in the class.
- Copying (by whatever means) another student's homework or duplicating another student's problem solving steps. This means it is not acceptable to do an assignment by having another student dictate the assignment's solution steps to you, or to let another student do things for you.
- Failure to acknowledge collaborators on homework and laboratory assignments.
- Submitting another student's work, in whole or in part, as your own on an assignment or exam.
- Copying (electronically or by hand) someone else's computer file, modifying it, and handing it in as your own work.
- Having someone load his/her assignment into the computer, then modifying it and handing it in as your own work.
- Allowing another person to copy all or part of your work, to hand in as their own. Thus, you should not provide a paper or electronic copy of your work to a classmate to use as a "reference" in doing their work. And you should not post your work on a website or an electronic bulletin board, or similar medium, for reference by others.

Penalties for such offenses on an exam, quiz, written assignment, or other required submission can include a failing grade for that assignment *or the course*, suspension or expulsion from the University, and/or a notation on your official transcript indicating academic dishonesty, and will be reported as required by ISU's Policy on Student Conduct.