CSE 241 Digital Systems

Summer 2017

Course Description

A course in digital principles which includes the following topics: fundamentals of digital logic, number systems, codes, computer arithmetic, Boolean algebra, minimization techniques, basic components of digital circuits such as logic gates and flip-flops, design of combinational and sequential circuits, memory devices, and programming logic. Recommended for sophomore-level students.

Learning Outcomes

- Understand and apply Boolean Algebra
- Understand logic gates and their operation
- Understand Karnaugh maps and apply them to simplify logic expressions
- Understand signed and unsigned integer representation and arithmetic
- MSI circuit decoders, multiplexers and design of combinational circuits
- Flip-flops and sequential circuit synthesis
- Verilog hardware description language, synthesis and simulation

Course Prerequisites

None

Required Materials:

Digital Design: With an Introduction to the Verilog HDL by M. Morris Mano and Michael D. Ciletti, Prentice Hall; 5 edition (January 12, 2012), ISBN-13: 978-0132774208

You will also buy a lab-kit of components customized for the course. You can buy at Jameco using one collective part number: 2244818
It costs $22.97 + shipping and handling.

Description	Quantity
KIT,830pt PLASTIC BREADBOARD W	1
IC,74LS00,DIP-14,QUAD 2-INPUT	1
IC,74LS04N,DIP-14,HEX INVERTER	1
IC,74LS08N,DIP-14,QUAD 2-INPUT	1
IC,74LS86N,DIP-14, QUAD 2-INPU	1
IC,74LS191N,DIP-16,SYNCH 4BIT	1
IC,74LS138N,DIP-16, 3-TO-8 DEC	1
IC,74LS32N,DIP-14, QUAD 2-INPU	1
@LED,RED,643NM,T-1 3/4,	10
@ LED,GRN,GRN DIF,T1-3/4,	10
@ LED MOUNTING HW,T1-3/4,BLACK	10
LED,GREEN,DIFFUSED,10mm	1
RES,100 OHM,1/4 WATT,5%	20
LED,SUPER RED,DIFFUSED,10mm	1

Optional Materials:

The second part that we will use is an Arduino Uno. This is a very versatile and highly useful microcontroller board. This is often used in prototyping small circuits. Once again you can get this separately from any source convenient for you. This is available at amazon.com. It is the cheapest on amazon.com. You can buy both I. and II. (Arduino) together at Jameco using one collective part number: 2244800
It costs $48.57 + shipping and handling.

Attendance

Lectures:
While attendance is not required, in class activities and quizzes may not be announced ahead of time.

Recitations/Labs:

If you complete your lab earlier than the full time assigned, attendance in the recitation is not required. When labs are assigned it is mandatory that you attend your assigned recitation section to perform your lab. Prelabs can only be signed off during your assigned lab section during the first of the recitations assigned for that specific lab. If you must miss your section, speak with your TA as soon as possible. Sections are full so attending other sections is not allowed without express permission. You are to use this time to work on your lab assignments however you may need to spend additional time outside of the recitation to complete the work. You may also use this time to work on other course related assignments.

Instructor Contact Information

Dr. Jennifer Winikus
Email: jwinikus@buffalo.edu
Website: www.cse.buffalo.edu/~jwinikus
Office Phone: 716-645-4757
Office: Davis 351

Office Hours

To be announced and by appointment.

Academic Content

This is a tentative list of topics:
- Number Systems
- Signed Arithmetic
- Boolean Arithmetic
- Karnaugh Maps
- Combinational Logic
- Logic Gates
- Sequential Logic
- Verilog Design

Grading Policies

Your grade will be comprised of:
20 % Exam 1
30 % Exam 2
15 % Homework, Quizzes and other assignments

35 % Laboratory Assignments
2% extra credit will be available by completing one the extra credit options provided.

Your final score for the course will be converted into a letter grade as follows:

- A: 100–94
- A-: 93–90
- B+: 89–87
- B: 86–84
- B-: 83–80
- C+: 79–77
- C: 76–74
- C-: 73–70
- D: 69–60
- F: 59–0

The instructor reserves the right to curve grades if appropriate and as they choose.

Incompletes (I/IU): The course follows the university undergraduate <u>incomplete</u> policy.
A grade of incomplete ("I") indicates that additional course work is required to fulfill the requirements of a given course. Students may only be given an "I" grade if they have a passing average in coursework that has been completed and have well-defined parameters to complete the course requirements that could result in a grade better than the default grade. An "I" grade may not be assigned to a student who did not attend the course.

Prior to the end of the semester, students must initiate the request for an "I" grade and receive the instructor's approval. Assignment of an "I" grade is at the discretion of the instructor.

The instructor must specify a default letter grade at the time the "I" grade is submitted. A default grade is the letter grade the student will receive if no additional coursework is completed and/or a grade change form is not filed by the instructor. "I" grades must be completed within 12 months – see the Incomplete Grade Policy for the schedule. Individual instructors may set shorter time limits for removing an incomplete than the 12-month time limit. Upon assigning an "I" grade, the instructor shall provide the student specification, in writing or by electronic mail, of the requirements to be fulfilled, and shall file a copy with the appropriate departmental office. Students must not re-register for courses for which they have received an "I" grade

Collaboration Policies

Unless explicitly told, all work is to be done independently with only the assistance of TAs and the instructor. You may discuss the general concepts of assignments and what the question asks for with other students but you must not discuss answers.

Unauthorized collaboration will result in an "F" in the course as a violation of academic integrity.

Exam Policy

There will be 3 exams. Two exams will be in class, the final exam is scheduled by the registrar. You must have a valid ID with you at the time of the exam (UB Card will suffice) and your own writing tools. You can not borrow pens or pencils during the exam. During the exam there is to be no talking or looking at your phone, doing so may result in an automatic "F" on the exam based on the incident.

Any accommodations must be made in advanced barring extraordinary circumstances.

Due Dates

All submissions will be made on UBLearns.

Late work:
No work will be accepted after midnight on Friday of the last week of classes barring extraordinary circumstances. This includes regrade requests.

All assignments have a time and a day due date. You may submit up to 24 hours late at no penalty. After that, no late work will be accepted, barring extraordinary circumstances and that no solutions have been released. In that case a late penalty may be applied. If a regrade is desired, you have 1 week from the time the grade is released to requesting a regrade. Corrections are not allowed on homework and lab assignments.

Email Policy

Students are responsible for email sent to their official University at Buffalo email address. Communication will not be done with non-university email addresses. A level of professionalism is expected with all communications.

Accessibility Resources

If you have any disability which requires reasonable accommodations to enable you to participate in this course, please contact the Office of Accessibility Resources, 60 Capen Hall, 716-645-2608, and also the instructor of this course. The office will provide you with information and review appropriate arrangements for reasonable accommodations.

University Policies

Academic Integrity Policy:
http://undergrad-catalog.buffalo.edu/policies/course/integrity.html

University Policy on Accommodations:
https://policy.business.buffalo.edu/Policy%20Library/Reasonable%20Accommodation.pdf

The Office of Equity, Diversity and Inclusion provides many resources including the following policies to be followed:

Discrimination and Harassment:
http://www.buffalo.edu/administrative-services/policy1/ub-policy-lib/discrimination-harassment.html

Reasonable Accommodation:
http://www.buffalo.edu/administrative-services/policy1/ub-policy-lib/reasonable-accommodation.html

Religious Accommodation and Expression:
http://www.buffalo.edu/administrative-services/policy1/ub-policy-lib/religious-accommodation-expression.html

Departmental Academic Integrity Policy
http://www.cse.buffalo.edu/undergrad/policy_academic.php

Departmental Statement on Academic Integrity in Coding Assignments and Projects

All academic work must be your own. Plagiarism, defined as copying or receiving materials from a source or sources and submitting this material as one's own without acknowledging the particular debts to the source (quotations, paraphrases, basic ideas), or otherwise representing the work of another as one's own, is never allowed. Collaboration, usually evidenced by unjustifiable similarity, is never permitted in individual assignments. Any submitted academic work may be subject to screening by software programs designed to detect evidence of plagiarism or collaboration.

It is your responsibility to maintain the security of your computer accounts and your written work. Do not share passwords with anyone, nor write your password down where it may be seen by others. Do not change permissions to allow others to read your course directories and files. Do not walk away from a workstation without logging out. These are your responsibilities. In groups that collaborate inappropriately, it may be impossible to determine who has offered work to others in the group, who has received work, and who may have inadvertently made their work available to the others by failure to maintain adequate personal security. In such cases, all will be held equally liable.

Departmental Policy on Violations of Academic Integrity

The CSE Department has a zero-tolerance policy for AI violation.
All AI violation cases will be reported to the department, school and university, and recorded.
Even the 1st offense will receive "F" for the course, unless the instructor deems it appropriate to reduce the penalty.
Subsequent violation of AI in any form and in any other course will automatically result in a "F" grade, with no exception.

Tentative Schedule

The schedule and content is subject to change.

Week	Date	Material
1	M 5/29	No Class Memorial Day
1	W 5/31	Introduction and intro to number systems, Signed and Boolean Arithmetic and Floating Point Basics
2	M 6/5	Simplification of Boolean Equations and

		Logic Gates
2	W 6/7	K-Maps and Combinational Logic
3	M 6/12	Exam Prep
3	W 6/14	Exam
4	M 6/19	Combinational Logic, Decoders and Muxes
4	W 6/21	Sequential Logic
5	M 6/26	More Sequential Logic and Verilog
5	W 6/28	Verilog
6	M 7/3	Exam Prep
6	W 7/5	Final Exam

Final exam is scheduled- In class July 5
Important Dates

First Day of Classes: May 29
Last Day to Drop/Add: June 1
Last Day to Resign: June 26
Last Day of Classes: July 5