CIS*3120: Digital Systems I
Computer Science, Winter 2021

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Course Web Page: Available through CourseLink: https://courselink.uoguelph.ca

General Description
The objectives of this course are to develop skills in the design and analysis of digital logic components and circuits, to make students thoroughly familiar with the basics of gate-level circuit design starting from single gates and building up to complex systems, and to provide exposure to circuit design using a schematic entry based computer-aided design tool.

Course Outline
Each bullet corresponds to *roughly* to 1-3 weeks of the semester.
- Overview of logic design
- Logic gates, DeMorgan-Equivalent Symbols, Positive and Negative Logic
- Truth Tables, SoP and PoS forms, K-maps, Hazards and Glitches, Q-M simplification
- Combinational Circuits: Adder, Subtractor, Ripple-Carry, Carry Lookahead, Generalized ALU Design, Multiplexers, De-multiplexers, Decoders, Encoders
- Sequential Circuits: Latches, Clocks, Flip-Flops, Registers
- Moore Machines, Mealy Machines, State-Minimization
- Semiconductor Memories: DRAM and SRAM
- Programmable Logic Devices: PROMs, PALs, PLAs, FPGAs

Textbook
- Mano. M. and M. Ciletti (2015-2018). *Digital Design*, Pearson
- Lab Exercises are provided online

Lectures
There are *three* lectures per week: MWF 10:30pm to 11:20am. However, to provide students with maximum flexibility when working in an online environment, lecture material will be pre-recorded and made available on CourseLink. Discussions with the teaching assistant will be held online during regular class hours, and will be managed through the Zoom interface available in CourseLink. These synchronous meetings will be used to answer questions and to review assignment solutions from the previous week. In particular, assignment solutions will be discussed during the Monday class, while both the Wednesday and Friday classes will be used for advising. Any questions that you have regarding course materials should be directed to the teaching assistant during these times.

Recorded Lectures and Labs in an Online World

Presentations which are made in relation to course work, including lectures, *cannot* be recorded, downloaded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

Teaching Assistants

There are three Teaching Assistants (TAs) assigned to this course:

- Mohsen Fathi Rizi
- Negin Piran Nanekaran
- Hamed Haddadpajouh

Mohsen is responsible for marking the labs and tests for Section 0101 of the course, while Negin is responsible for marking the labs and tests for Section 0102. Hamed is responsible for marking all of the weekly homework problems and for providing advising during the weekly lecture times. Therefore, please make sure that you contact the correct individual if you have any issues regarding grades.

Contact information for each teaching assistant is posted on CourseLink. Discussions with the TAs will take place either through the Zoom facility that is part of CourseLink or via email. All requests for re-grades must be made by email to the TA who marked your homework/lab within one week of the grade being posted on CourseLink. It is your responsibility to be vigilant and check your grades regularly. Late requests will not be considered.

Course Evaluation

Your final grade will be determined as follows:

Weight	Description	Notes
15%	Weekly Homework Problems See semester schedule at end of this document for dates	Due Friday, 11:59pm. May be handed in up to 2 days late without penalty. **No further extensions will be granted for any reason.**
30%	Two tests, each with weight 15% See semester schedule at end of this document for dates	Online during regular class hours. Must have a camera and turn it on during test. **No exceptions.**
55%	11 Lab Exercises Labs 1-10 have a weight of 4.5% each, Lab 11 has a weight of 10%. See semester schedule at end of this document for dates	Labs are due at the end of the scheduled 2-hour lab section. However, labs can be handed in up to two days after this due date without penalty. **No other extension will be granted for any reason.**
Total Grade = 15% (Homework) + 15% (Test 1) + 15% (Test 2) + 55% (Labs)		

Homework

Weekly homework problems are used to reinforce material learned from watching the online lectures and performing the textbook readings. Homework problems will be made available each week on CourseLink, and will be due each Friday at 11:59pm. As stated in the table above, homework problems can be submitted up to 2 days late. This provides a buffer to deal with sickness, technical issues, family problems, etc. *No further extension will be given for any reason*.

Homework questions will be made available in PDF. You are expected to submit your answers in PDF. If you are not able to do this, please take this course at a later date when it will be possible to submit paper assignments.

Answers to homework problems will be marked on a scale of 0 to 1.5 percent. You are strongly encouraged to attend Monday advising hours (during regular class time) to verify your solutions. Written solutions will not be posted online. *The weight for missed homework cannot be assigned to other grade items*.

Labs

All labs will be held in a virtual room through the Zoom interface available in CourseLink. Prior to your scheduled lab, you will receive a Zoom invitation from your teaching assistant to enter the virtual lab room at the scheduled time. This invitation should not be shared with others. Students can only attend their own scheduled lab section. This is because each student has their own marker – the teaching assistant assigned to their section. Therefore, do not ask the lab instructor to allow you to move between lab sections – even temporarily.

Prior to attending your scheduled lab section, you should have completed most, if not all, of the lab exercise on your own. Any outstanding questions can then be targeted to the lab instructor for clarification. Keep in mind that you are expected to submit your completed lab electronically at the end of the scheduled lab, so please come prepared.

Lab exercises will be completed using LogicWorks – a Windows based schematic-entry tool for logic simulator. This software is accessible through the School of Computer Science Windows' servers. Please visit the School's wiki (wiki.socs.uoguelph.ca) if you require technical help connecting to the sever. In you require further help, please send a ticket to help@socs.uoguelph.ca. Do not contact the instructor, nor the teaching assistants, as they are unable to help with network-related issues.

Lab exercises will be made available in PDF. You are expected to submit your answers to written questions in PDF. If you are not able to do this, please take this course at a later date when it will be possible to submit paper assignments. *The weight for missed labs cannot be assigned to any other grade item*.

Tests

Both tests in this course will be written during normal class hours. You are expected to be able to print off the exam and submit your answers in PDF. If you are not able to do this, please take this

course at a later date when it will be possible to have a paper test. Also, for the sake of academic integrity, you will be expected to turn your camera on while writing the test. If you cannot do this, or if you are not willing to do this, please take this course at a later date when it will be possible to write exams in a face-to-face environment. *Failure to write a test cannot be added to the final exam as there is no final exam. Rather, to ensure that learning objectives are met, an INC grade will be submitted at the end of the semester until a deferred condition (i.e., a deferred test) is approved and completed in S21.*

Electronic Mail

As per university regulations, all students are required to check their username.uoguelph.ca e-mail account regularly: e-mail is the official route of communication between the University and its students, and will be relied on heavily in this course.

Considerations and Constraints for Online Learning

- Do not redistribute recorded interactive discussions that involve your instructor, teaching assistant or classmates. This includes advising times, lab times, and question and answer sessions with the instructor.

- Do not download, copy, or redistribute any of the pre-recorded lectures available on CourseLink.

- Online activities such as advising times, question and answer sessions, and interactive lectures may be recorded by the instructor or TAs and posted to Courselink. By taking this course you are agreeing that your participation in these activities can be used in this manner. If you do not wish to have your image or voice recorded as part of these activities then either do not take this course or do not ask verbal questions during these activities.

- A reliable internet connection that is sufficient for online learning is necessary for this course. If you do not have a sufficiently fast and reliable internet connection, you may not be able to view lectures or other course material. It may also not be possible to attend labs or online advising with teaching assistants or the instructor. By taking this course, you are agreeing that you have access to all of the necessary resources to fully participate in the activites of this course.

- This course is offered in the Eastern Standard Time (EST) zone. While taking this course you will be required to attend online activities such as advising times or labs between 8:30am and 8:20pm EST.

- Keep copies of labs and homework problems that you have submitted. You may be asked to resubmit these at a later time.

- Do not download, copy, or upload any course material (Intellectual Property) to other sites on the internet, including Chegg and CourseHero, or share course material in any other way. To do so will be treated as a violation.

A Word of Caution

Needless to say, plagiarism in any form must be dealt with severely. *There is no group work in this course. Therefore, when answering questions do it yourself. Be original.* All submitted items will be checked for plagiarism, as well as for uploads to websites, like Chegg, in search of answers. All cases of academic misconduct are handled by the Dean, in conjunction with the Department Chair. Successive infractions of misconduct affirmed by this process could have consequences as serious as expulsion from the University. *(It is your responsibility to acquaint yourself with the definitions and ramifications of academic misconduct as described in the university's undergraduate Calendar.)* The risks are sufficiently great that they are not worth taking. If you are having trouble, please see the teaching assistant or the instructor for help. Moreover, if you are not sure whether a potential action is appropriate, check either with the instructor or Greg Klotz or April Nejedly – the undergraduate faculty advisors for the School of Computer Science.

Schedule of Dates

The table below shows the (due) dates for all homework problems (HW) and lab (LAB) exercises, along with the dates of Test 1 and Test 2.

Graded Item	Homework	Tuesday Lab	Friday Lab	Tests
HW1/LAB1	22-01-21	19-01-21	22-01-21	
HW2/LAB2	29-01-21	26-01-21	29-02-21	
HW3/LAB3	05-02-21	02-02-21	05-02-21	
HW4/LAB4	12-02-21	09-02-21	12-02-21	
Test 1				22-02-21
HW5/LAB5	26-02-21	23-02-21	26-02-21	
HW6/LAB6	05-03-21	02-03-21	05-03-21	
HW7/LAB7	12-03-21	09-03-21	12-03-21	
HW8/LAB8	19-03-21	16-03-21	19-03-21	
HW9/LAB9	26-03-21	23-03-21	26-03-21	
Test 2				29-03-21
HW10/LAB10	02-04-21	30-03-21	02-04-21	
LAB11		06-04-21	09-04-21	