

COURSE TITLE: ENGR 271 Digital Logic Design

CREDITS: 3

ROOM: IA-212

CRN: 26950

LECTURE: (Pre Recorded Lectures Online)

RECITATION: (IA-212) (Time you can ask Questions as a class): Monday 2:00 to 2:50 pm

IN-CLASS EXAMS: (IA-212)

- **Exam #1: Monday Oct 18, 2021 at 2:00 to 2:50 pm**
- **Exam #2: Monday Nov 1, 2021 at 2:00 to 2:50 pm**
- **Exam #3: Monday Nov 15, 2021 at 2:00 to 2:50 pm**
- **Final Exam: Wednesday Dec 8, 2021 at 3:00 to 4:50 pm**

<https://www.linnbenton.edu/calendars/finals-schedule.php>

LABS: ENGR272 (IA-215)

INSTRUCTOR: Craig Munsee

EMAIL: munsec@linnbenton.edu

OFFICE: IA-206

OFFICE HOURS (Additional time you can ask Questions): (Zoom Meeting: Link in Moodle)

- **Wednesday Noon - 12:50 pm**
 - **Thursday Noon - 12:50 pm**
 - **Friday Noon - 12:50 pm**
 - **Others by Appointment**
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Course Description:

- Provides an introduction to digital logic and state machine design. Covers logic design, including logic gates, gate minimization methods, and design with standard medium scale integration (MSI) logic circuits. Includes basic memory elements (flip-flops) and their use in simple-state machines.

Prerequisite(s):

- Prerequisite: MTH 231 Elements of Discrete Mathematics or MTH 251 Differential Calculus with a grade of "C" or better.

Course Outcomes:

- Upon successful completion of this course, students will be able to:
 1. Analyze and design combinational theoretical systems using standard gates and minimization methods.
 2. Analyze and design combinational theoretical systems composed of standard combinational modules, such as multiplexers and decoders.
 3. Analyze and design simple theoretical synchronous sequential systems.

4. Analyze and design sequential theoretical systems composed of standard sequential modules, such as counters and registers.
5. Analyze and design simple theoretical systems composed of programmable logic devices.

Text Book:

- **Digital Design and Computer Architecture, ARM Edition.** Authors: Sarah Harris David Harris or Digital Design and Computer Architecture, 2nd Edition. Authors: Sarah Harris David Harris.
- **Digital Design and Computer Architecture: ARM Edition, is available for free to the students through the LBCC Library's Ebook Central database.** <http://bit.ly/digides>

Grading:

Assignment:	Number:	Percentage:
Homework	10	30%
Exams	4	70%
Total		100%

- 90-100% A, 80-89% B, 70-79% C, 60-69% D, < 59% F
- The class is designed to go over the material in the lectures and work through the example problems. After completing the weeks' worth of lectures, you should be ready to work on the homework. You are given one additional week to complete the homework and turn it in. This is also the case for the labs. This gives you the opportunity to work on the assignment over the weekend and be able to ask question before the assignment is due. If you wait till the day the assignment is due, you run the risk of not being able to get answers to questions and possibly not completing the assignment on time.
- There will not be any extra assignments given beyond those listed, so please **do not** email the instructor to ask if there is anything extra you can do to improve your grade.

Homework:

- Homework problem sets are linked in Moodle and are to be turned in to Moodle by 11:55 PM on the day they are due. If there is a problem with Moodle, you may email the assignment to the instructor.
- Homework is to be scanned to a PDF and turned in to Moodle for grading.
- **The lowest homework grade will be dropped.**
- **Late homework will not be accepted unless an extension has been requested prior to the due date. A student is allowed only one two-day extension for a homework assignment.**
- Each problem will be checked for a reasonable attempt at solving.
- Solutions to the homework problems will be posted in Moodle after the homework is due.
- The Student is responsible for turning the homework in on time and in the recommended format. They are also responsible for turning in the correct homework. If the homework is not turned in on time or the wrong assignment has been submitted, a score of zero will be given for that assignment.

Exams:

- The exams will be in-class timed tests and will only be given on the day indicated above.
- **If you miss the exam on the day it has been offered, it is the reasonability of the student to arrange for a make-up exam. There will be a 10% grade penalty for each additional day**

you are later than the original exam date.

- No exam grades will be dropped.

Holidays:

- Veterans Day: LBCC will be closed (**Thursday, Nov 11, 2021**)
- Thanksgiving: LBCC will be closed (**Thursday, Nov 25, 2021 and Friday, Nov 26, 2021**)

Class Climate Survey:

- Student feedback is important to improve this course and to help the instructor know how to adjust teaching methods. Your feedback is taken seriously and does influence future versions of the course. The evaluations are anonymous, and links to the evaluations will be emailed to your student LBCC email account after the 5th week of the term. I encourage you take this opportunity to provide constructive feedback on the class. Thank you in advance for your input!
- **Extra Credit will be given for those who completing the Class Climate Survey.** Since the survey is anonymous you are asked to attach a screen shot showing that you completed the survey (Not a screen shot of your answers). A place to turn this in can be found on week 7 of Moodle.

Academic Integrity:

- You are expected to turn in your own work and not take credit for the work of others.
- For Homework and Lab assignments, you may work together and discuss the problems with your classmates, but you are expected to turn in your own work. If you turn in something that is not your work, it is considered cheating (This includes copying and sharing computer files).
- **No collaboration is allowed for Exams.**
- **Depending on the severity of the incident, those caught cheating and those who aid them will receive a score of zero for that assignment or fail the class and will be reported to Jill Childress, Ed. D. | Manager, Student Conduct and Retention.**

Computer & Software Requirements:

- You will need a computer capable of running the Digital Electronics DEEDS software, Quartus Prime Lite software, and ModelSim. All are windows versions.
- To use a Mac computer, a windows environment would need to be installed on the computer to run the software (Oracle's VirtualBox).
 - <https://www.virtualbox.org/>
- You should install these programs the first week to determine if your computer can run the programs correctly.
- If you are considering purchasing a new computer, I would recommend a Windows-based Laptop with an Intel i7 processor, 16 GB of RAM, and at least a 500 GB hard drive. MacOS computers are good computers too, but are limited when it comes to compatibility for Engineering software.

College Policies

COVID-19 CLASSROOM REQUIREMENTS FOR ALL STUDENTS AND FACULTY

Linn-Benton Community College has established rules and policies to make the return to the classroom as safe as possible. It is required for everyone to follow all of the campus rules and policies. To participate in this class, LBCC requires all students to comply with the following:

<https://www.linnbenton.edu/about-lbcc/college-services/safety/covid19/index.php>

MASKS REQUIRED AT ALL TIMES IN CLASSROOM

Wear a mask or face covering indoors at all times. Your mask or face covering must be properly worn (fully covering nose and mouth and tight-fitting). Mesh masks, face shields, or face covering that incorporates a valve designed to facilitate easy exhalation are not acceptable. If you have a medical condition or a disability that prevents you from wearing a mask or cloth face covering, you must obtain an accommodation from CFAR (Center for Accessibility Resources) to be exempt from this requirement. State guidelines do not limit class size. Physical distancing accommodations can be made upon request and cleaning supplies are also available for personal use.

TESTING RESOURCES

We are also so pleased to announce that FREE TESTING for Covid-19 will be available for students and employees at our Albany Main Campus (located at the Campus Bookstore's book-buy-back window by the Business Office); the Health Occupations Center in Lebanon, and the Benton Center in Corvallis, beginning next week and continuing throughout the term. LBCC will have access to the results and they will be used for contact tracing purposes only. Use of the testing facility is also not mandatory, but is being provided as a resource for individuals who may wish to get tested.

AVAILABILITY OF DISPOSABLE MASKS, N95 MASKS, CLEANING SUPPLIES, ETC.

If you've accidentally forgotten your mask, LBCC will have supplies available throughout our campus locations and high-traffic areas. In addition, if you would like to request an N95 mask, the college will have a limited supply available and we will do our best to accommodate you. Cleaning supplies will also be made available for staff who request them. Please visit the Facilities Office for special supply requests, or visit one of these locations where general supplies will be available.

WHERE TO REPORT A POSITIVE CASE OF COVID AND HOW TO KNOW IF YOU NEED TO QUARANTINE

In the event of a positive diagnosis of coronavirus, we appreciate your support in reporting it to our Office of Finance and Operations by contacting floms@linnbenton.edu. College administration will then work with local health authorities to begin contact tracing, and others who may have been exposed will be notified. The identity of the individual or individuals infected will be kept confidential, but you will be informed if a quarantine is necessary. If you are not informed about a close contact, you do not need to quarantine.

Drop/Withdraw Policy:

If you are withdrawing from the class, you must file a Schedule Change Form with Registration or use WebRunner. If you formally drop the class **before Monday of the second week of the term**, you will receive a tuition refund. If you withdraw after the Monday of the second week of instruction through the seventh week a 'W' will show up on your transcript. **No withdrawals are allowed after the end of the seventh week**. An instructor may not assign a "W" grade.

If you received financial aid or veteran's benefits, PLEASE talk with associates at the appropriate office to determine what effects on eligibility dropping a course will have. Don't jeopardize your

eligibility!! You can contact the Financial Aid Office by calling (541) 917-4850 or by visiting the Financial Aid Office in Takena Hall.

If you stop attending the course without formally withdrawing you will continue to accumulate grades (zeroes for all assignments not turned in) and will receive the grade assigned by the instructor. You will also be held accountable for all charges on your account.

Center for Accessibility Resources (CFAR):

You should meet with your instructor during the first week of class if:

1. You have a documented disability and need accommodations.
2. Your instructor needs to know medical information about you.
3. You need special arrangements in the event of an emergency.

If you have documented your disability, remember that you must make your request for accommodations through the Center for Accessibility Resources Online Services web page every term in order to receive accommodations. If you believe you may need accommodations but are not yet registered with CFAR, please visit the CFAR website at <http://www.linnbenton.edu/cfar> for steps on how to apply for services or call 541-917-4789 or cfar@linnbenton.edu.

LBCC Comprehensive Statement of Nondiscrimination

LBCC prohibits unlawful discrimination based on race, color, religion, ethnicity, use of native language, national origin, sex, sexual orientation, gender, gender identity, marital status, disability, veteran status, age, or any other status protected under applicable federal, state, or local laws. For further information see Board Policy 1015 in our Board Policies and Administrative Rules. Title II, Title IX (employee cases), & Section 504: Scott Rolen, Director of Human Resource Development and Support, CC-108, 541-917-4425; Title IX (student cases): Jill Childress, Manager for Student Conduct and Retention, WH-215, 541-917-4806, LBCC, Albany, Oregon. If you feel you have been discriminated against in any interaction at Linn-Benton Community College, or have been harassed by another person while at LBCC, or wish to report any concern or complaint, please navigate to this page to make a report: linnbenton.edu/report-it. This and additional information can be found at <https://www.linnbenton.edu/about-lbcc/administration/policies/equal-opportunity.php>.

Know your rights and responsibilities:

LBCC students have rights: the right to free speech, the right to assemble, the right of a free press, etc. LBCC students also have responsibilities to their community: the responsibility to participate and engage in class, the responsibility to advocate for their needs (ask for help), the responsibility to support a respectful teaching and learning environment, the responsibility to treat all persons with respect, the responsibility to be truthful and honest in all work and communications, and the responsibility to follow staff directions, local, state, and federal laws.

Rights and responsibilities balance together to create the best learning environment. For example, while you have free speech in the café or courtyard, in class the instructor decides whose turn it is to talk and what the topics for conversation will be. Students are free to believe what they believe, but instructors may require students to learn and recite concepts, principles, or theories for a class even if the student does not believe those concepts. You play a role in creating a positive community at LBCC.

Please review your rights and responsibilities (<http://linnbenton.edu/go/studentrights>).

If you believe a student is violating your rights, ask to be treated with respect. If that does not cure the situation, report to Associate Dean Dr. Lynne Cox, Takena Hall Rm. 107. If you believe a faculty member or LBCC employee is violating your rights, please report to Human Resources, Scott Rolen,

Calapooia Center Rm. 108.

Student Resources:

LBCC has many resources to help our students be successful and overcome difficulties so that you can focus on learning. If you have a need, please contact your advisor for assistance and they can help direct you to the services you need. A list of some of these resources can be found in Aviso or the link below. <https://linnbenton.avisoapp.com/aviso/app/resourceGuide/index>

Changes to the Syllabus

I reserve the right to change the contents of this syllabus due to unforeseen circumstances. You will be given notice of relevant changes in class, or through LBCC e-mail.

ENGR 271 Class Schedule:

Week:	Topics Covered:	Assignments Due:
1 Sep 27	<ul style="list-style-type: none"> • Syllabus • Number Systems 	<ul style="list-style-type: none"> • Syllabus Quiz (Take by Sunday Oct 3)
2 Oct 4	<ul style="list-style-type: none"> • Logic Gates • Combinational Logic Design • Boolean Equations • ENGR271 ICA 2 	<ul style="list-style-type: none"> • Homework #1 (Due on Wednesday Oct 6)
3 Oct 11	<ul style="list-style-type: none"> • Simplifying Equations • Karnaugh Maps • ENGR271 ICA 3 • Intro to Deeds Software 	<ul style="list-style-type: none"> • Homework #2 (Due on Wednesday Oct 13)
4 Oct 18	<ul style="list-style-type: none"> • Logic Design Part 1 • Logic Design Part 2 • ENGR271 ICA 4 	<ul style="list-style-type: none"> • Exam #1 (Monday Oct 18) • Homework #3 (Due on Wednesday Oct 20)
5 Oct 25	<ul style="list-style-type: none"> • Timing • Hardware Description Languages (HDLs) Part 1 • LATCHES AND FLIP-FLOPS • SYNCHRONOUS LOGIC DESIGN • ENGR271 ICA 5 	<ul style="list-style-type: none"> • Homework #4 (Due on Wednesday Oct 27)
6 Nov 1	<ul style="list-style-type: none"> • State Machine Example 1 • State Machine Example 2 • Working with other Flip-Flops 	<ul style="list-style-type: none"> • Exam #2 (Monday Nov 1) • Homework #5 (Due on Wednesday Nov 3)
7 Nov 8	<ul style="list-style-type: none"> • Design of Counters • Registers • Mealy State Machines • ENGR271 ICA 6 	<ul style="list-style-type: none"> • Homework #6 (Due on Wednesday Nov 10)
8 Nov 15	<ul style="list-style-type: none"> • State Reduction • Implication Table State Reduction • HDL Parser and Lab 5 Help 	<ul style="list-style-type: none"> • Exam #3 (Monday Nov 15) • Homework #7 (Due on Wednesday Nov 17)
9 Nov 22	<ul style="list-style-type: none"> • Hardware Description Languages (HDLs) Part 2 • ENGR271 ICA 7 • Deriving a FSM from a Schematic • ENGR271 ICA 9 	<ul style="list-style-type: none"> • Homework #8 (Due on Wednesday Nov 24)
10 Nov 29	<ul style="list-style-type: none"> • Dead Week 	<ul style="list-style-type: none"> • Homework #9 (Due on Wednesday Dec 1)
Finals Dec 6		<ul style="list-style-type: none"> • Final Exam (Wednesday Dec 8)