Digital Logic and Computer Systems

EEL 3701C

Class Periods: MWF, Period 3 (9:35 AM - 10:25 AM)

Lecture Location: CSE A101

Academic Term: Fall 2025

eel3701.ece.ufl.edu

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Course Description
(4 credits) Overview of logic design, algorithms, computer organization and assembly language programming and computer engineering technology. Laboratory.

Course Prerequisites / Corequisites
Required: None.
Helpful: Some programming experience.

Course Objectives
Perform basic manipulations of Boolean algebra and simplify logic expressions, design and optimize combinational and sequential circuits, and learn of different register-transfer level components. Study the organization of a microprocessor, including the instruction set architecture, design, and assembly programming.

Materials and Supply Fees
$41.80 for the rental of a Terasic DE10-lite Development Board (Provided during first lab section)

Required Software and Hardware
- *Logisim-Evolution*: this is an educational software for designing and simulating digital logic circuits. It is ***free*** and open-source.
- *Intel Quartus Prime Lite*: this is a tool for designing digital logic circuits. This software is ***free***.
- *ModelSim*: this is a tool for simulating digital logic circuits. This software is ***free***.
- Digital Analog Discovery 3: this will be provided in the first lab. This is borrowed.
- *Laptop computer* with the minimum specifications as per college guidelines

Recommended Materials
- Fundamentals of Logic Design 7th Edition, by Jr. Charles H. Roth, Larry L Kinney, Eugene B. John, Cengage Publishing. ISBN-13: 978-1133628477, ISBN-10: 1133628478
- Computer Organization and Design MIPS Edition: The Hardware/Software Interface (The Morgan Kaufmann Series in Computer Architecture and Design) by David A. Patterson, John L. Hennessy, ISBN-13: 978-0124077263

Attendance Policy, Class Expectations, and Make-Up Policy
Class attendance is required, and this is recorded through iClicker. Contact Dr. Bobda if you need to use Zoom to attend class in any extenuating circumstances.
Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. Click here to read the university attendance policies:
https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/

Laboratory Guidelines
See Lab Guidelines for more detailed information regarding laboratories.

Lab attendance is mandatory. Missing your lab will result in a zero for that lab, even if you previously submitted the lab documents. However, **one lab drop is allowed**. Missing more than one lab requires documentation for each absence. Every lab consists of a demo and either a quiz or an in-lab activity. Lab reports must be completed using the provided Lab Report Template and submitted with the name "**labX.pdf**". All code, circuit designs, and lab reports must be completed and submitted by the **Sunday night before the lab, 11:59 PM**, with a **one day late penalty of 25%**.

Lab grades will be distributed: 40% from lab reports, 20% from demos, and 40% from quizzes/activities. Lab demos are done at the beginning of class, so ensure that you come to the lab prepared with all required hardware and software.

Evaluation of Grades

Assignment	Percentage of Final Grade
Laboratory	35%
Homework	10%
Midterm Exam	25%
Final Exam	25%
Attendance	5%
Total	100%

Grading Policy

Letter	from	to	Points		Letter	from	to	Points
A	93.4	100	4.00		C	73.4	76.6	2.00
A-	90.0	93.3	3.67		C-	70.0	73.3	1.67
B+	86.7	89.9	3.33		D+	66.7	69/9	1.33
B	83.4	86.6	3.00		D	63.4	66.6	1.00
B-	80.0	83.3	2.67		D-	60.0	63.3	0.67
C+	76.7	79.9	2.33		E	0	59.9	0.00

More information on UF grading policy may be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Laboratory Topics

Lab	Topic(s)
0	Intro to EEL3701C Lab
1	Basic Logic Design
2	Hierarchical Design, Combinational Components
3	Counters, Flip-Flops
4	ALU Design with registers
5	ASM & FSM Design
6	CPU with ROM instructions

7	CPU simulation with assembly

Exam Dates

Date	Exam
Oct. 14	Midterm (8:00 PM - 10:00 PM), Location TBD
Dec. 10	Final Exam (10:00 AM - 12:00 PM), Location TBD
TBD	Makeup

Course Schedule

The following course schedule is tentative and may vary due to time constraints or class interests. (**Note**: U - Sunday) Hurricanes may cause shifts in schedule. The most up-to-date information is available on the course Google Calendar.

Week	Lab	Day	Lecture	Weekly Topic(s)	Due
1	No Labs	F, 8/22	1	Introduction to the course, expectations Binary numbers and codes	
2		M, 8/25	2	Octal, Hex, Signed Binary Numbers Logic Operations, Gates, Truth Tables, ICs, Universal Gates Activation Levels, V-Tables, SOP/POS	
		W, 8/27	3		
		F, 8/29	4		
		U, 8/31			Pre-lab 0
3		M, 9/1		Holiday	
	LAB START **TUESDAY** 0	W, 9/3	5	DeMorgan's Laws, Logic Identities Karnaugh Maps, Quine-McClusky	
		F, 9/5	6		
		U, 9/7			Pre-lab 1
4		M, 9/8	7	Arithmetic Components Encoders/Decoders Multiplexers/Demultiplexers Binary to 7-segment	HW 1
	LAB START **TUESDAY** 1	W, 9/10	8		
		F, 9/12	9		
		U, 9/14			Pre-lab 2
5		M, 9/15	10	Clock Synchronous vs Asynchronous circuits Sequential Logic, Flip Flops Counters Buses	HW 2
	LAB START **TUESDAY** 2	W, 9/17	11		
		F, 9/19	12		
		U, 9/21			Pre-lab 3
6		M, 9/22	13	Serial vs Parallel Registers Arithmetic Logic Unit (ALU)	HW 3
	LAB START **TUESDAY**	W, 9/24	14		
		F, 9/26	15		

		U, 9/28			
7	3	M, 9/29	16	ALU Implementation State Machines - Mealy vs Moore	
	Exercises	W, 10/1	17		
		F, 10/3	18		
		U, 10/5			Pre-lab 4
8	4	M, 10/6	19	Algorithmic State Machines Finite State Machines	HW 4
		W, 10/8	20		
		F, 10/10	21		
		U, 10/12			
9	Optional	M, 10/13	22	**T, 10/14: EXAM 1**	
		W, 10/15	23	State Machines Continued RAM/ROM	
		F, 10/17		Homecoming	
		U, 10/19			Pre-lab 5
10	5	M, 10/20	24	CPU Design Instruction Register Fetch, Decode, Execute Cycle	HW 5
		W, 10/22	25		
		F, 10/24	26		
		U, 10/26			
11	Exercises	M, 10/27	27	Conditionals Memory Implementation	
		W, 10/29	28		
		F, 10/31	29		
		U, 11/2			Pre-lab 6
12	6	M, 11/3	30	Larger Processors (MIPS)	
		W, 11/5	31	Assembly Programming	
		F, 11/7	32		
		U, 11/9			
13	Exercises	M, 11/10	33	Assembly Programming	HW 6
		W, 11/12	34		
		F, 11/14	35		
		U, 11/16			Pre-lab 7
14	7	M, 11/17	36	Floating point numbers Modern Assembly Languages Datapath	
		W, 11/19	37		

		F, 11/21	38		
		U, 11/23			
BREAK					
15	No Labs	M, 12/1	39	Final Exam Review	HW 7
		W, 12/3	40		
16		W, 12/10		**W, 12/10: EXAM 2**	

Relation to Program Outcomes (ABET):

Outcome	**Coverage***
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	High
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	Medium
3. An ability to communicate effectively with a range of audiences	
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	Medium
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	

*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not covered or assessed in the course.

Academic Policies & Resources

To support consistent and accessible communication of university-wide student resources, instructors must include this link to academic policies and campus resources: https://go.ufl.edu/syllabuspolicies. Instructor-specific guidelines for courses must accommodate these policies.

Commitment to a Positive Learning Environment

The Herbert Wertheim College of Engineering values varied perspectives and lived experiences within our community and is committed to supporting the University's core values.

If you feel like your performance in class is being impacted, please contact your instructor or any of the following:

- Your academic advisor or Undergraduate Coordinator
- HWCOE Human Resources, 352-392-0904, student-support-hr@eng.ufl.edu
- Pam Dickrell, Associate Dean of Student Affairs, 352-392-2177, pld@ufl.edu