University of Rhode Island
ELE208/209: Introduction to Computing Systems
Fall 2018

Instructor: Resit Sendag
Office: **URI at** Schneider Electric
Office Hours: 1:00 pm – 2:00pm, Mondays and Wednesdays, or by appointment, at Pastore 125
Email: sendag@ele.uri.edu
Phone: 401-874-9423

Teaching Assistant: Matt Constant
Office: Pastore 125
E-mail: mconstant@my.uri.edu
Office hour: TBA

Class web page: http://www.ele.uri.edu/faculty/sendag/ele208

Time and Location:
Lectures: 11:00 – 11:50am, Mon, Wed, Fri, Swan 203.
Labs: Section 1: 2:00- 4:45pm, Monday, Section 2: 2:00 – 4:45pm, Wednesday, Engineering Computer Center, Kirk building, room 212.

Credits: ELE 208 (3 credits) + ELE 209 (1 credit)

Prerequisite: High school algebra; some experience using or programming computer systems

Required Text:
1. *Introduction to Computing Systems: From Bits and Gates to C and Beyond, 2nd edition*, Yale N. Patt and Sanjay J. Patel, McGraw-Hill, 2003. ISBN 0-07-237690-2. – Use for ELE 208 and 209
3. *Guide to Using the Unix Version of the LC-3 Simulator*, by Kathy Buchheit (available at http://highered.mcgraw-hill.com/sites/0072467509/student_view0/lc-3_simulator_lab_manual.html) – Use for ELE 209.

The required text is available at the bookstore in Memorial Union.

Course Objective:
Most introductory computer courses focus on high-level language programming. They typically take an "information hiding" approach that abstracts away all of the interesting details of the underlying computer system. While this type of abstraction can be a very useful technique for enhancing productivity, it is most helpful after you understand the fundamental concepts of a computing system, such as data representation, the operation of memory, and so forth. Without this fundamental knowledge, the information hiding approach actually inhibits understanding. You are too often left wondering how everything fits together, which leads to rote memorization instead of real comprehension. In contrast to this highly abstract, top-down approach, this course presents a bottom-up view that addresses a broad foundation of topics in computing systems. This more concrete view helps eliminate the mystery about how a computer actually works by tying every new concept to a frequently developing foundation. As a result, nothing in the computer system appears to happen magically. This course will introduce the fundamental concepts of computing systems, from the machine level to high-level language programming, including transistors and logic circuits, memory and pointer addressing, binary arithmetic and data representation, data types and structures, and assembly language. The course is designed for first-year students in computer engineering, electrical engineering, and computer science, although students from other disciplines may also find it interesting.

Grading:

ELE 208:	**Attendance**	**5%**

	Homework	5%
	Exam 1	25%
	Exam 2	25%
	Final	40%
	Extra Credit Project	10%
ELE 209:	7-8 lab assignments	100%

Letter grades will be assigned according to the following scale:

A	>= 94%	C+	>= 64%
A-	>= 88%	C	>= 58%
B+	>= 82%	C-	>= 52%
B	>= 76%	D+	>= 46%
B-	>= 70%	D	>= 40%
		F	< 40%

In calculating the letter grade breakpoints, the effective 100% mark will be the average of the total scores obtained by the top 5% of the class.

Any questions regarding grading must be brought to the attention of the TA or the instructor within 1 week after the item in question is returned.

Computer Accounts:
If you don't already have one, you must get an *ELE account* to use the machines in Engineering Computer Center at Kirk building. Make sure you come to the first lab with your student ID, which is needed to obtain the account. A storage area is granted for each ELE account designated as the folder /ugrads/*account*. So if the login being used is *yourname*, the storage location for this user is /ugrads/yourname. You will automatically get an email account: yourname@ele.uri.edu.

Workload
It is expected that you put in three hours a week per credit to be successful in an undergraduate course. If you want to excel in this course, you are most likely going to need to spend more time working on the course outside of the classroom or the lab.

Exams
There will be two mid-term exams and a final exam, the dates (tentative) of which are given on last page of this syllabus. All exams will be open-book, but no notes, papers or electronic devices will be allowed. The final exam will be comprehensive, covering all the material presented during the semester. There is no make-up for missed exams, except in cases of illness (a physician's note will be required) or family emergency, and these makeup exams may be different than that given in class.

Extra Credit Project
All students are welcome to work on an extra credit (10%) project to improve their grades. The project requires substantial amount of work in LC-3 assembly language programming, e.g., writing a complete disassembler in LC-3 assembly language.

Homework
- Homework will be assigned frequently and provides the best way of keeping up with the course material. Expect to see similar questions in midterm exams and the final! Homework should be **hand written** and handed in during the lecture on the date it is due. Late homework will not be accepted, as the solutions will be posted right after the submission deadline.

- As long as a reasonable attempt has been made on all of the problems, full credit will be given for the assignment. It is okay to work in groups on the homework, but each student must submit their own hand written solutions.

Labs

- All labs are due at the time indicated in the assignment description. Late assignments will receive a reduction of 15% of the maximum possible score for each day they are late.
- You will be evaluated individually to determine your final course grade. However, you are encouraged to work in groups of two on the lab assignments. Everyone who works together on the same assignment will receive the same grade for that assignment.

Disability Services

- Any student with a documented disability is welcome to contact me as early in the semester as possible so that we may arrange reasonable accommodations. As part of this process, please be in touch with Disability Services for Students Office at 302 Memorial Union, Phone 401-874-2098.

Miscellaneous

- Assigned reading is to be done prior to the class.
- We will discuss valuable information in class, so you are expected to attend all classes and to attend the lab/discussion section for which you are registered.
- **If you miss 6 classes / 3 labs, you get an F from the class/lab!** No exceptions unless it is due to sickness and you have doctor's note!

Expected Course Outline

Week	Topic	Class Reading	Labs
1	Introduction	Ch. 1	
2	bits, data types and arithmetic Arithmetic and Logical ops Transistors, basic logic gates	Ch.2 Ch. 3	Lecture in Lab
3	Combinational Logic Memory, Sequential Logic	Ch. 3	Lab1: Intro to UNIX
4	 Flip flops, State machines Q & A	Ch. 3	Lab 2: Advanced Unix
5	Von Neumann Model Oct. 5: EXAM 1	Ch. 4	Recitation
6	Oct. 8 – No Class (Columbus Day) LC-3 computer, ALU instructions	Ch. 5	No Lab
7	Memory instructions, Control insts. Assembly Language Assembler	Ch. 5 Ch. 7	Lab 3 LC-3 Simulator
8	Q & A I/O	Ch. 8	Lab 4: Programming the LC-3
9	Q & A Trap Routines Subroutines	Ch. 8 Ch. 9	Lab 5: Conditional Branching
10	Q & A Stack basics, Arithmetic using stack Nov. 12 – No Class (Veterans day) Nov 13 – Mon classes are held	Ch. 10	Lab 6a: Assembly and debugging
11	Q & A Review Nov 16: EXAM II	Ch. 5-10	Lab 6b: Assembly and Debugging
12	C programming Nov 23 – No Class (Thanksgiving)	Ch. 11-12	Lab 7: C intro
13	C programming C to LC-3	Ch. 13-16	Lab 8: C to LC-3
14	Review	Ch. 1-16	Extra Credit Project

15	FINAL EXAM – Dec 14 @ 9:00am		Extra Credit Project