CpSc 370, Computer Organization and Architecture
Syllabus, Spring, 2016
Dr. Conlon

Catalog Description: This course will study computer organization topics such as data representation, Boolean logic, memory hierarchy, and data path design. It will study computer architecture topics such as CPU control, pipelining and instruction set architecture. The course will also introduce the architecture and software models involved in parallel computing. Students will learn the assembly level machine organization by means of a standard assembly language. Prerequisite: CpSc 246, Advanced Programming Principles. (3 credits)

Class Meeting:

Section	Time	Place
1	MWF 10:00-10:50 a.m.	ATSH 230

Instructor:

Name	Phone	Email	Office
Michael P. Conlon, Ph.D.	724-738-2143	michael.conlon@sru.edu	ATSH 252

Office hours: As indicated below, or by appointment.

Day	Mon	Tue	Wed	Thu	Fri
Time	2 p.m.-4 p.m.	11 a.m.-12 m.	9 a.m.-10 a.m.	11 a.m.-12 m.	

Office hours are for you. Please feel free to visit me to discuss any problems. Do not wait until problems become unmanageable. If I am doing other work during my office hours, it is because no student has come to see me. I will gladly drop what I am doing to help you. If my office hours are inconvenient, see me before or after class and we will find a better time to meet.

Grading:

Exams	Project	HW, Labs Service, etc.
45%	45%	10%

Exam dates:

	Exam 1	Exam 2	Final
Section 1	Feb 22, 24	Mar 28, 30	Wed, May 4, 10:30 a.m.-12:30 p.m.

Text: *Computer Systems A Programmer's Perspective*, second edition, © 2011, by Bryant and O'Hallaron, Prentice Hall. ISBN #978-0-13-610804-7.

Software: This course will use the Linux operating system extensively. It is strongly suggested that you install Linux on your personal computer. I recommend Debian Linux, available from http://www.debian.org, but any current distribution, such as Red Hat, Fedora, SuSe, or Ubuntu is acceptable.

Linux is available both in the Unix Lab, ATSH 224, and when using obsidian.sru.edu. However, it is a lot more convenient to have Linux running on your own computer. (You're likely to have a more up-to-date version, too.)

Late Assignment Policy: Late assignments will not be accepted, and will receive a grade of zero. Exceptions will be made only in extraordinary circumstances.

Attendance, reading, and participation:
- You are expected to attend every class and to arrive on time. Do not expect to be admitted to class if you are late, except on days with severe weather.
- Please do all assigned reading *before* the class in which it is covered. You are expected to attend and participate in class, and you must do the reading and homework to participate.

Exams:
- Exams will cover both text and lecture material. Some text material may not be covered in class, and much material covered in class is not in the text. You must both do the reading and attend class to succeed.
- If you must be absent for an examination, please see me one week in advance to make alternate arrangements to take the exam.
- Please take care of bodily needs before coming to an exam: you will not be permitted to leave the room during an exam until your paper is handed in.
- All electronic communication, computation, and entertainment devices must be turned off and put away during exams. Use of such devices during an exam will be considered cheating. On some exams, four-function calculators may be permitted, but not scientific calculators, graphing calculators, or calculators with alphabetic keyboards.

Labs:
- Labs will be graded on completion, i.e, *acceptable* (100) or *unacceptable* (0).
- Your first responsibility in lab is to complete the lab assignment. When that is complete, you may work on CpSc 370 project work or homework. If you have no outstanding homework or project, make and test modifications to programs you have completed, or work on an assembly-language programming project of your choice. Your lab grade will be reduced if you are not working on coursework during lab time.
- If you do not complete your lab assignment during lab time, you must demonstrate it to the instructor within two classes or it will be marked as *unacceptable (0).* It is your responsibility to find out whether a class you missed was a lab, and, if so, what the assignment was.

Service, etc.: You will be expected to complete four service/professional-development activities during the semester. For an activity to be eligible, it must be an organized activity and it must meet one of the following criteria:
- It helps you prepare for the world of work you will enter after graduation,
- You help others to use computers, or
- You learn more about computing, jobs in computing, or computing in industry.

Such activities may take the form of lectures on or off campus, resumé workshops, dress-for-success workshops, job fairs, Computer Technology Club meetings, or service activities for the community. If you are not sure whether an activity will count, ask me! Day-long activities count double.

In general, I do not produce these activities. You are expected to watch the bulletin boards around campus to find activities that qualify. There will be plenty of them available, but if you wait until the end of the semester to start looking, you will not be able to complete this assignment.

Recording of Lectures: Video and/or audio recording of lectures is prohibited unless the instructor or the Office for Students with Disabilities has granted you this accommodation. The instructor reserves the right to reduce your grade should you make illicit recordings.

Plagiarism policy:
- Cooperation in doing homework and lab work is encouraged.
- If you have cooperated with anyone in your homework projects, you must indicate that person's name in your header comments or it will be counted as plagiarism.
- You are not to cooperate with others outside your team *in any way* in the development of your programming project, except as specified in the assignment. Importation of unmodified code from the Internet is plagiarism.
- Plagiarism or collusion on a project or exam will earn you a failing grade for the activity, and you may be reported to the committee on academic integrity.

Email: I may communicate via electronic mail, using your SRU address. Assignments may be announced or modified this way. Be sure your email account is properly set up. You are responsible for checking your SRU email regularly.

High Impact Practices: This course will make use of the following practices that have been correlated with student success:
- Intensive writing
- Collaborative assignments
- Service learning

Copyright Permission: By registering in this course you grant the SRU Computer Science Department permission to copy any of your work from the course for use in assessment or accreditation processes, provided that. nformation that identifies you is removed from such work.

The following statement is required of SRU faculty in order to comply with the TEACH Act, which modifies U.S. copyright law primarily to deal with the copyright implications of online education. The link to references is mine.

Copyright Statement: Students shall adhere to the laws governing the use of copyrighted materials. They must ensure that their activities comply with fair use and in no way infringe on the copyright or other proprietary rights of others. Additional information regarding copyright and fair use can be found at www.teachingcopyright.org/handout/copyright-faq

Course Outcomes: This course and its outcomes support the Information Technology Learning Outcomes of **Problem Solving and Critical Thinking** (PS&CT)and **Commuication and Interpersonal Skills** (C&IS). These Computer Science Learning Outcomes are tied directly to the University Wide Outcomes of **Critical Thinking and Problem Solving** and **Communication**.

Learning Outcomes	Assessed Course Objectives
PS & CT b. Integrate design and implementation principles to develop effective applications	1. Write modular assembly language programs that execute to given specifications, terminate normally, are well documented, and are readable.
C & IS a. Document all aspects of a system precisely and clearly	
PS & CT a. Formulate project requirements and alternative solutions appropriate to the computing problems	2. Design and construct digital circuits using basic SSI and MSI gates, using both combinatorial and sequential logic.
PS & CT c. Perform critical analyses of the impacts of decisions based on mathematics	3. Perform basic operations on signed and unsigned integers in decimal and binary number systems.

Additional Course Objectives include that the student will be able to:

1. Perform basic operations with signed and unsigned integers in decimal and binary number systems.
2. Explain the regular operation of a computer in terms of the fetch-decode-execute cycle and the interaction between the instruction set architecture and the computer organization.
3. Trace and explain the result(s) of the execution of a given instruction or sequence of instructions in a subset of assembly language.

Calendar (tentative), with assigned readings:

Date		Topic	Reading
Jan	20	Introduction	Ch. 1
	22	Representing and Manipulating Information	Ch. 2
	25		
	27	Machine-Level Representation of Programs	Ch. 3
	29		
Feb	1		
	3		
	5		
	8		
	10	Processor Architecture	Ch. 4
	12		
	15	Optimizing Program Performance	Ch. 5
	17		
	19		
	22	Exam 1	
	24	Exam 1	
	26	The Memory Hierarchy	Ch. 6
	29		
Mar	2		
	4	Linking	Ch. 7
	14		
	16		

	18		
	21	Exceptional Control Flow	Ch. 8
	23		
	25		
	28	Exam 2	
	30	Exam 2	
Apr	1	Virtual Memory	Ch. 9
	4		
	6		
	8	System-Level I/O	Ch. 10
	11		
	13		
	15	Network Programming	Ch. 11
	18		
	20		
	22	Concurrent Programming	Ch. 12
	25		
	27		
	29		
May	2		
	4	Final exam, 10:30 a.m.-12:30 p.m.	