Computer Science Department
cs.salemstate.edu/dept

SYLLABUS **Spring 2011**

CSC 295 Computer Architecture and Organization 3 cr.
Prerequisite(s): CSC 202J with a grade of C+ or higher; CSC 200A; PHS205

Instructor: Beifang Yi **Office**: MH 208D **Phone**: (978) 542-7426
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Section	Time	Room	Final Exam
01	W & F 1:30-2:45pm	MH 301	**Thursday, 5/5, 2:00pm-4:00pm MH 301**

Catalog description:
This course examines the basic principles of computer systems and how these concepts relate to the design of such systems. Both hardware and software concepts are considered and the interdependence between them are covered. Determining basic tradeoffs and related decisions are covered. Logic level designs, data representations, computer circuits, fundamental computer operations, program creation, I/O programming, processing elements, links and interfaces, memory hierarchy, and memory management are covered. Three lecture hours per week.
Prerequisites: CSC 202J with grade of C+ or higher, plus CSC 215 and PHS 205.

Goals:
The goals of this course are to introduce students to the concepts of the organization and architecture of computer systems, from the physical and logic levels through the intermediate levels to the higher-level-language level, and the methodologies and problem-solving strategies used define and implement the necessary ingredients. Specific goals are to:

CG01: present the concept of a computer system as a series of levels, each with its own properties and methodologies;
CG02: introduce a series of problem solving methodologies relating to the various system levels;
CG03: discuss problem-solving techniques based on the presented methodologies.

Objectives:
Upon successful completion of the course, a student will have:

CO01: demonstrated knowledge of the concepts of computer architecture and organization;
CO02: demonstrated the ability to apply appropriate problem-solving strategies to solve a selection of typical problems in computer architecture and organization;
CO03: gained hands-on experience designing an ALU based on a set of specified requirements;
CO04: implemented a simple instruction set computer with a control unit and a data path;
CO05: developed a good understanding of memory hierarchy in a computer system;
CO06: developed an understanding of an I/O subsystem supporting processor programmed I/O, direct memory access and interrupt structures;
CO07: developed an understanding of basic concepts of a multi-core processor design;
CO08: participated in at least one group project that involves solution design, analysis and evaluation.

Course Topics:

A detailed topics list and a general course bibliography can be found on the Computer Science Department website at http://cs.salemstate.edu/dept/uploads/2_CSC295withBoK1.pdf.

Text:

(Required) **Computer Organization: Principles, Analysis & Design,** 1st Edition
By Lan Jin and Bo Hatfield, Tsinghua University Press, 2004, ISBN: 7-302-07719-3

Software:

- Altera Quartus II logic circuit design software.
- For details, please check the Laboratory section of the class website.

Hardware:

- Altera DE3 Board
- (For details, please check the Laboratory section of the class website.)

Cell phones:

Turn the ringer off, or, better yet, *turn the phone off*.

Class Attendance:

Class policy is that of the Registrar's office - see the University catalog for details. Lecture will start promptly at the scheduled time, so please make a serious effort to not be late; if you *have* to be late, please be discrete when entering the classroom. While class attendance does not *directly* affect your final grade, some of the material covered in class is not found (in the same form) in the text, so class attendance and notes are very important. Note that you are at all times responsible for materials and assignments discussed in class: if you miss a class, try to get lecture notes from a classmate and review them **before** the next lecture, and **check your email or visit course homepage** (http://cs.salemstate.edu/~b_yi/2011Spring/CSC295/index.html) **for any materials that may have been distributed**. Each student is responsible for completing all course requirements and for keeping up with all that goes on in the course (whether or not the student is present).

Assignments Homework):

Each assignment will have an assigned due date and time. Assignments submitted late will be penalized (*see **Submission Deadlines / Late Penalties** below*).

Each assignment may have different full scores, depending on the difficulty and the amount of the work of the exercises. There will be one or two extra assignments given in the semester and these extra assignments will be used as make-up assignments. Any assignment may be used as the extras. The average score (percentage) for the overall assignments will be the total scores received for all the assignments divided by the total scores of the required assignments. Please refer to Final Grade below for the grading weights of the assignments.

Assignments are the most important part of the course work; practice with and fulfillment of the assignments will greatly help the exams.

Lab Exercises:

There will be several lab activities scheduled in the same class hours. Lab meeting times and place will be announced in the class. Lab exercises will be the important part of the course work. Attendance during lab time is ***STRONGLY* recommended** since we don't have regular lab hours for preparatory lab exercises.

These lab exercises are designed help reinforce the understanding of the topics in the course and gaining hands-on experiences in the computer architecture and organization. Labs will be performed in the form of team work. The limited lab meeting times scheduled in the class hours will ***not*** be sufficient for the completion of the lab exercises.

We will use Quartus II CAD tools by Altera Corporation for the lab exercises. Altera Corporation is one of the leaders in innovative custom logic solutions. The detailed information of lab exercises can be found on the Laboratory pages of the course homepage.

Lab Exercises counts 30% towards the semester total scores. Failing to complete at least 70% of lab exercises will result in a grade of "F" for the course. A written lab report is required for each of the labs.

Final Grade:

Final grade will be determined using the following grading weights:

homework	30%
labs	30%
midterm examination	18%
final examination	22%

Attendance is not used to calculate the final grade: however, note that you are at all times responsible for assignments and materials presented in class.

The following table shows how the course work is assessed against the course objectives:

	Homework	Exams	Labs
CO01	✓	✓	✓
CO02	✓	✓	✓
CO03	✓		✓
CO04			✓
CO05	✓	✓	✓
CO06	✓	✓	
CO07	✓	✓	
CO08			✓

Exams:

There will be two exams, a midterm (usually in week 8) examination and a *comprehensive* final examination. Please refer to Final Grade above for the grading weights of the exams.

Missed Tests:

Tests (exams) may not be made up except for *documented emergency* situations. If a test must be made up, arrangements must be made with the instructor to take the test before it is discussed in class (usually within a week of the test being administered).

Study Groups:

- Homework assignments should be completed individually.
- Lab exercises will be performed in groups:
    - A group consists of 2 people.
    - A group submits one lab report for each of the labs.
    - One person can be a member of only one group, though he/she does not have to stay in one group through all the labs (i.e., he/she may be different groups for different labs).
    - If one would like to complete the labs individually, that will be OK under the condition that he/she must participate in at least one group lab work as a group member.

Submission Deadlines / Late Penalties:

- ***Any assignments submitted after 5/4/2011 will receive ZERO.***
- ***All other*** late submissions will be penalized according to the following table.
- (If you cannot submit your work because of unexpected situations, please contact the instructor ASAP for extended submission time—usually upon documented notice.)

Amount of Time Being Late	Deduction
(1 second, 2 days]	10%
(2 days, 1 week]	30%
(1 week, 3 weeks]	50%
(3 weeks, ∞)	100%
Any assignments submitted after 5/4/2011	**100%**

Academic Integrity:

Academic Integrity Policy and Regulations can be found in the University Catalog and on the University's website (http://www.salemstate.edu/content_images/academic_integrity_regulations_2007(1).pdf). The formal regulations are extensive and detailed - familiarize yourself with them if you have not previously done so. A concise summary of and direct quote from the regulations: "Materials (written or otherwise) submitted to fulfill academic requirements must represent a student's own efforts". *Submission of other's work as one's own without proper attribution is in direct violation of the University's Policy* and will be dealt with according to the University's formal Procedures.

"Salem State College is committed to providing equal access to the educational experience for all students in compliance with Section 504 of The Rehabilitation Act and The Americans with Disabilities Act and to providing all reasonable academic accommodations, aids and adjustments. Any student who has a documented disability requiring an accommodation, aid or adjustment should speak with the instructor immediately. Students with Disabilities who have not previously done so should provide documentation to and schedule an appointment with the Office for Students with Disabilities and obtain appropriate services."

In the event of a university declared critical emergency, Salem State University reserves the right to alter this course plan. Students should refer to http://www.salemstate.edu for further information and updates. The course attendance policy stays in effect until there is a university declared critical emergency. In the event of an emergency, please refer to the alternative educational plans for this course located at http://cs.salemstate.edu/~b_yi/2011Spring/CSC295/index.html. Students should review the plans and gather all required materials before an emergency is declared.

Please remember that if, for any reason, you decide to drop this course, you **MUST** do so officially through the Registrar's office. The last day to withdraw from a course this semester is **Friday**, **April 15th**, **2011**.

Note: This syllabus represents the intended structure of the course for the semester. If changes are necessary, students will be notified in writing and via all regular class communication mechanisms (class discussion, emails, and/or the course homepage through the instructor's website at http://cs.salemstate.edu/~b_yi/.).