Introduction to Computer Organization and Architecture  
CS 286-001 - Summer 2021 (CRN: 25162)  

Synchronous-Online Course  

Welcome to CS 286!

Instructor: Dr. Hiroshi Fujinoki  
Office: EB 2034  
Email: hfujino@siue.edu  
URL: www.siue.edu/~hfujino  
Office Phone: (618) 650-3727

Office Hours: Monday: 1:00 - 2:45 P.M.  
Tuesday: 10:00 A.M. -12:00 P.M.  
Wednesday: 1:00 - 2:45 P.M.  
Thursday: 10:00 A.M. -12:00 P.M.  
Friday: by appointment (please make an appointment 24 hours prior to the time you want to meet the instructor).

Note: All the office hours slots are by zoom meetings (no face-to-face meetings in my office without a prior appointment).

Class Meeting Room: online (no classroom assigned to this course)  
Class Meeting Days: Monday, Wednesday, and Friday  
Class Meeting Time: 3:00-4:25 P.M.

Note: item with "♠" symbol means an important item.

♠ Course Prerequisites:
CS150 (Introduction to Computing II) with a minimum grade of C or the instructor's permission. If you have not completed CS150, please talk to the instructor.

♠ Grading:  

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
<th>Final Letter Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizzes</td>
<td>10%</td>
<td>100-92: A</td>
</tr>
<tr>
<td>Programming projects (5+5+5%):</td>
<td>15%</td>
<td>91-82: B</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>37.5%</td>
<td>81-72: C</td>
</tr>
<tr>
<td>Final Exam</td>
<td>37.5%</td>
<td>71-62: D</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Below 62: F</td>
</tr>
</tbody>
</table>

1
Exams:

- Exams will be closed textbook and closed notes.
- During an exam, everyone is required to login the exam zoom session and activate a webcam.
- Makeup exam will be offered only for medical emergency (with a signed doctor's letter). Makeups for any other reasons will not be provided (no exception).
- Absence from an exam or failing to submit your work by the end of an exam will result in zero point for the exam (except medical emergencies).
- Exams will cover reading assignments and required exercise questions.
- Any error regarding your graded exams should be reported to Dr. Fujinoki within two weeks (14 calendar days) after your attendance status is posted to the course web site.

Course Projects:

- Programming projects using assembly language for MIPS R3000 Processor (we use MIPS R3000 emulator).
- Course programming projects are all individual project (no collaboration is allowed either for designs and coding).
- The project specifications will be provided in the class.

Lecture (zoom meeting) Attendance:

- Attending the zoom meetings during 3:00 - 4:25 p.m. is required.
- During each lecture (zoom meeting), some information ("attendance keys") will be provided (can be more than once in each meeting). Each attending student should send the provided information to the TA (using e-mail) of this course within a given time limit (60 seconds) for your credit. If information for your attendance credit is provided more than once, attendance credit for that particular lecture can be earned only if all the attendance keys in a zoom lecture are sent to the TA.
- No penalty will be given up to two absences in a semester. For each absence beyond the second absence, -2 point penalty (in 100 scale) will be given to your next exam.
- The above penalty will not apply to your medical emergency (however, you need to provide a written proof of medical service to waive the penalty).
- Any error regarding your lecture attendance status should be reported to Dr. Fujinoki within two weeks (14 calendar days) after your attendance status is posted to the course web site.
 Academic Dishonesty:
Following activities (but not limited to them) will be considered academic dishonesty:

I. Exams:
(a) Communicating (e-mails, phone calls, and texting, but not limited to them) with anyone during exams.
(b) Using materials not allowed during exams.
(c) Anyone committing academic misconduct above (I-(a) or (b)) will receive a failing grade for this course and reported to the department chair as well as to the dean of the school of engineering.

II. Programming Projects:
(a) Submitting work totally or partially done by somebody else (this includes any human/electronic sources (such as web sites and even another course at SIUE)).
(b) Submitting program source code files (for the programming projects) that are developed by collaborations with other people. This includes both program designs and implementations.
(c) Anyone committing academic misconduct above (II-(a) or (b)) will receive a failing grade for this course and reported to the department chair as well as to the dean of the school of engineering.

 Required Textbook:
- The lecture notes and the PPT slides presented in the classroom are summaries of the course textbook. The course syllabus specifies the textbook chapters/sections each student should read ideally before each lecture (at least after each lecture).

Other Requirements for this Course:
- Experience with C/C++ (UNIX environment)
- Data structure or discrete structure

 Disability Support:
- Students who believe they may need accommodations in this class are encouraged to contact the office of Disability Support Services as soon as possible. It is the students' responsibility to alert the instructor to SIUE
sanctioned accommodations. If anyone needs assistance from SIUE Disability Support Services, please contact them.

♣ Other Notices:

(1) This course expects each of you to work nine (9) hours other than attending lectures (this is also a policy of SIUE).

(2) Each of you is expected to check "Weekly Notices" in the web site of this course at least twice in a week. The decisions regarding which course materials are posted belong to the course instructor. If any promised course material is missing in the course home, it is your responsibility to request such material to the course instructor (the course instructor will post such materials within at most one week since the request).

(3) Any grading problem should be reported within two weeks (14 days) after your grades are posted to the course home or the graded materials are returned in the classroom.

(4) E-mails sent to the course instructor during weekends may not be responded.

(5) Any special arrangement agreed between you and the course instructor (Dr. Fujinoki) should be documented. Any promises or agreements orally made between you and the course instructor may not take effect without a documentation (it is your responsibility to document any such promises and agreements).

(6) Ask your questions to the course instructor whenever you have anything you do not have a clear answer for. Please do not make your own assumptions (if you do, you are responsible for any assumptions you make when they are not correct).
Tentative Class Schedule (subject to change):

This schedule is tentative and subject to change. However, any change will be announced in the class or noticed in the notice page of the instructor.

This schedule is tentative and subject to change.

<table>
<thead>
<tr>
<th>Week #: Day</th>
<th>Topics</th>
<th>Reading Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Week 1:</strong> June 2 (W):</td>
<td>Introduction to CS286, Computer abstractions, the role of performance</td>
<td>Chapter 1 (1.1 through 1.5)</td>
</tr>
<tr>
<td></td>
<td>Arithmetic for computers</td>
<td>Chapter 4 (4.1 through 4.6)</td>
</tr>
<tr>
<td></td>
<td>Introduction to assembly language</td>
<td>Chapter 2 (2.1 through 2.6)</td>
</tr>
<tr>
<td></td>
<td>June 4 (F): Introduction to assembly language</td>
<td></td>
</tr>
<tr>
<td><strong>Week 2:</strong> June 7 (M):</td>
<td>Quiz #1, Assembly language using MIPS CPU Project Phase #1 Assigned</td>
<td>Handout #1</td>
</tr>
<tr>
<td></td>
<td>June 9 (W): Assembly language using MIPS CPU</td>
<td>Handout #2</td>
</tr>
<tr>
<td></td>
<td>June 11 (F): Assembly language using MIPS CPU</td>
<td>Handout #2</td>
</tr>
<tr>
<td><strong>Week 3:</strong> June 14 (M):</td>
<td>Quiz #2, Program control structure in assembly language</td>
<td>Chapter 3 (3.5 and 3.6)</td>
</tr>
<tr>
<td></td>
<td>June 16 (W): Arithmetic for computers</td>
<td>Chapter 4 (4.1 through 4.6)</td>
</tr>
<tr>
<td></td>
<td>June 18 (F): Arithmetic for computers</td>
<td>Chapter 4 (4.1 through 4.6)</td>
</tr>
<tr>
<td><strong>Week 4:</strong> June 21 (M):</td>
<td>Quiz #3, Arithmetic for computers (cont’d)</td>
<td>Chapter 4 (4.7 and 4.8)</td>
</tr>
<tr>
<td></td>
<td>June 23 (W): Processor data-path and control</td>
<td>Chapter 5 (5.1 and 5.2)</td>
</tr>
<tr>
<td></td>
<td>June 25 (F): Processor data-path and control</td>
<td>Chapter 5 (5.1 and 5.2)</td>
</tr>
<tr>
<td><strong>Week 5:</strong> June 28 (M):</td>
<td>Quiz #4, Processor data-path and control (cont’d) Project Phase #1 Due</td>
<td>Chapter 5 (5.3, 5.4 and 5.5)</td>
</tr>
<tr>
<td></td>
<td>June 30 (W): Pipeline hazards and code optimization</td>
<td>Chapter 6 (6.1 through 6.6)</td>
</tr>
<tr>
<td></td>
<td>July 2 (F): Quiz #5, Pipeline hazards and code optimization</td>
<td>Chapter 6 (6.1 through 6.6)</td>
</tr>
<tr>
<td><strong>Week 6:</strong> July 5 (M):</td>
<td>Midterm Exam, Project Phase #2 Assigned Memory hierarchy, cache performance analysis</td>
<td>Chapter 7 (7.1 through 7.3)</td>
</tr>
<tr>
<td></td>
<td>July 7 (W): Memory hierarchy, cache performance analysis</td>
<td>Chapter 7 (7.1 through 7.3)</td>
</tr>
<tr>
<td></td>
<td>July 9 (F): Virtual memory, memory performance analysis</td>
<td>Chapter 7 (7.4 and 7.5)</td>
</tr>
<tr>
<td><strong>Week 7:</strong> July 12 (M):</td>
<td>Quiz #6, Virtual memory, Memory performance analysis</td>
<td>Chapter 7 (7.4 and 7.5)</td>
</tr>
<tr>
<td></td>
<td>July 14 (W): I/O subsystem</td>
<td>Chapter 8 (8.1 through 8.4)</td>
</tr>
<tr>
<td></td>
<td>July 16 (F): I/O subsystem</td>
<td>Chapter 8 (8.1 through 8.4)</td>
</tr>
</tbody>
</table>
**Week 8:**  
July 19 (M): I/O subsystems (cont’d)  
July 21 (W): I/O subsystems (cont’d)  
July 23 (F): Quiz #7, I/O subsystems (cont’d)  

**Week 9:**  
July 26 (M): Multi-processor systems  
July 28 (W): Multi-processor systems (cont’d)  
July 30 (F): Quiz #8, Multi-processor systems (cont’d)  

*Project Phase #2 Due*

**Week 10:**  
August 2 (M): Topics TBA  
August 4 (M): Topics TBA  
August 6 (F): Final Exam (cumulative exam)

- The list of the reading assignment is the minimum requirement. It is expected that each student voluntarily studies not only the required sections but other related sections or materials to maximize the learning during the semester.
- Required reading should be done before the lecture.
- If you have any problem for the above schedule, please contact to Dr. Fujinoki as soon as possible.
- Any question regarding this syllabus should be addressed to: hfujino@siue.edu