Introduction to Computer Organization and Architecture
CS 286-001 - Summer 2019 (CRN: 24072)

Welcome to CS 286!

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

Office Hours: (1) Mondays: 1:00 - 2:30 P.M.  
(2) Wednesdays: 1:00 - 2:30 P.M.  
(3) Fridays: only on appointments (i.e., no “walk-in” office hour on Fridays)

Note 1: The above office hours will not be applied to the final exam week. During the final exam (Week 10), please contact Dr. Fujinoki for your appointment.

Note 2: Office hours may be cancelled, when Fujinoki needs to attend other classrooms or meetings for his committee duties. Office hour cancellations will be announced in the course home of CS286-001.

Class Meeting Room: EB-3140
Class Meeting Days: Monday, Wednesday, and Friday
Class Meeting Time: 9:45-11:00 A.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:  
Weekly quizzes: 20%  
Programming assignments (7+18): 25%  
Midterm Exam: 20%  
Final Exam: 35%

Weight:  
Final Letter Grade:
100-92: A  
91-82: B  
81-72: C  
71-62: D  
Below 62: F
Exams:
- Exams will be closed textbook and closed notes.
- Makeup exam will be given only for medical emergency (with a signed doctor's letter).
- Absence from an exam will result in zero point for the exam (except medical emergencies).
- If you need any special assistance, you should contact Dr. Fujinoki at least one week before.
- A calculator is allowed in the exams (however sharing a calculator during an exam is NOT allowed – everyone needs to bring your own calculator).
- 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.

Quizzes:
- There will be 10 quizzes during this course (each quiz takes 10 to 15 minutes). The quizzes are closed textbook, notebooks and neighbors (you are allowed to use your pens, pencils, blank papers, eraser(s) and a calculator during a quiz). After the last lecture in a week, the questions that will appear in the next quiz will be posted to the CS286-001 home.
- Makeup quizzes will be provided only for medical emergency (makeup quiz will not be provided for any other reasons).
- The lowest quiz will be dropped from your course grade at the end of the semester.
- Any error regarding your quiz grades should be reported to Dr. Fujinoki within two weeks (14 calendar days) after your attendance status is posted to the course web site.
**Attendance Policy:**

- Attendance will be taken at the beginning of lectures (being late more than 5 minutes may be considered absence).
- No penalty will be given up to two absences in a semester. For each absence beyond the second absence, a -2 point penalty (in 100 scale) will be given to your next exam.
- The above penalty will not apply only to your medical emergency (however, you need to provide a written proof of medical service to waive the penalty).
- More than nine absences will result in a failing grade for this course (no matter what the reasons for absences are).
- Any error regarding your class 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. Weekly quizzes and exams:
   - (a) Watching and copying your neighbors' solutions during quizzes and exams.
   - (b) Using materials not allowed during quizzes and 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. Homework and 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 grade of zero on the assignment plus a warning for the first infraction. Anyone committing a second infraction will automatically fail the course and/or be brought up on charges of academic misconduct, which may result in expulsion from the university.
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:
- This course expects each of you to work at least nine (9) hours other than attending lectures (this is also a policy of SIUE).
- Important announcements will be made at the beginning of a lecture.
- If you are absent from a lecture, it is your responsibility to find the announcements and the contents in the missed lecture (you are suggested to talk to your classmates).
- Each of you is expected to check "Weekly Notices" in the web site of this course (you can reach the course web site from http://www.siue.edu/~hfujino) at least once 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.
- Any grading problem should be reported within two weeks (14 days) after their grades are posted or the graded materials are returned in the classroom.
• Any electric device, such as smart phone, laptop PC, and tablet computer (except a calculator), should not be used during lectures and exams.

• E-mails sent to the course instructor during weekends and the break (spring break) may not be responded until Monday in the following week.
### Tentative Class Schedule (subject to change):

This schedule is tentative and subject to change.

<table>
<thead>
<tr>
<th>Week #:</th>
<th>Day</th>
<th>Topics</th>
<th>Reading Assignments</th>
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</thead>
<tbody>
<tr>
<td><strong>Week 1:</strong></td>
<td>June 3 (M):</td>
<td>Introduction to CS286, Computer abstractions, the role of performance</td>
<td>Chapter 1 (1.1 through 1.5)</td>
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<td>June 5 (W):</td>
<td>Arithmetic for computers</td>
<td>Chapter 4 (4.1 through 4.6)</td>
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<td>June 7 (F):</td>
<td>Introduction to assembly language</td>
<td>Chapter 2 (2.1 through 2.6)</td>
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<td><strong>Week 1:</strong></td>
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<td><strong>Week 2:</strong></td>
<td>June 10 (M):</td>
<td>Quiz #1, Assembly language using MIPS CPU</td>
<td>Handout #1</td>
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<td></td>
<td>June 12 (W):</td>
<td>Assembly language using MIPS CPU</td>
<td>Handout #2</td>
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<tr>
<td></td>
<td>June 14 (F):</td>
<td>Assembly language using MIPS CPU</td>
<td>Handout #2</td>
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<td><strong>Week 3:</strong></td>
<td>June 17 (M):</td>
<td>Quiz #2, Program control structure in assembly language</td>
<td>Chapter 3 (3.5 and 3.6)</td>
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<td>June 19 (W):</td>
<td>Arithmetic for computers</td>
<td>Chapter 4 (4.1 through 4.6)</td>
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<td>June 21 (F):</td>
<td>Arithmetic for computers</td>
<td>Chapter 4 (4.1 through 4.6)</td>
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<td><strong>Week 4:</strong></td>
<td>June 24 (M):</td>
<td>Quiz #3, Arithmetic for computers (cont’d)</td>
<td>Chapter 4 (4.7 and 4.8)</td>
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<td>June 26 (W):</td>
<td>Processor data-path and control</td>
<td>Chapter 5 (5.1 and 5.2)</td>
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<tr>
<td></td>
<td>June 28 (F):</td>
<td>Processor data-path and control</td>
<td>Chapter 5 (5.1 and 5.2)</td>
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<td><strong>Week 5:</strong></td>
<td>July 1 (M):</td>
<td>Quiz #4, Processor data-path and control (cont’d)</td>
<td>Chapter 5 (5.3, 5.4 and 5.5)</td>
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<td>July 3 (W):</td>
<td>Pipeline hazards and code optimization</td>
<td>Chapter 6 (6.1 through 6.6)</td>
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<td>July 5 (F):</td>
<td>Quiz #5, Pipeline hazards and code optimization</td>
<td>Chapter 6 (6.1 through 6.6)</td>
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<td><strong>Week 6:</strong></td>
<td>July 8 (M):</td>
<td>Midterm Exam, Project Phase #2 Assigned</td>
<td>Chapter 7 (7.1 through 7.3)</td>
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<td>July 10 (W):</td>
<td>Memory hierarchy, cache performance analysis</td>
<td>Chapter 7 (7.1 through 7.3)</td>
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<td>July 12 (F):</td>
<td>Virtual memory, memory performance analysis</td>
<td>Chapter 7 (7.4 and 7.5)</td>
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<td><strong>Week 7:</strong></td>
<td>July 15 (M):</td>
<td>Quiz #6, Virtual memory, Memory performance analysis</td>
<td>Chapter 7 (7.4 and 7.5)</td>
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<td>July 17 (W):</td>
<td>I/O subsystem</td>
<td>Chapter 8 (8.1 through 8.4)</td>
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<td>July 19 (F):</td>
<td>I/O subsystem</td>
<td>Chapter 8 (8.1 through 8.4)</td>
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<td><strong>Week 8:</strong></td>
<td>July 22 (M):</td>
<td>I/O subsystems (cont’d)</td>
<td>Chapter 8 (8.5)</td>
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<td></td>
<td>July 24 (W):</td>
<td>I/O subsystems (cont’d)</td>
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Week 9:  July 29 (M): *Multi-processor systems*  
        July 31 (W): *Multi-processor systems (cont’d)*  
        August 2 (F): *Quiz #8, Multi-processor systems (cont’d)*  
        Project Phase #2 Due

Week 10: August 5 (M): *Exam reviews*  
        August 7 (W): *Final Exam (cumulative exam)*