Introduction to Computer Organization and Architecture  
CS 286-002 - Fall 2017 (CRN: 37692) 

Welcome to CS 286!

Instructor: Dr. Hiroshi Fujinoki  
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Email: hfujino@siue.edu  
URL: www.siue.edu/~hfujino  

Office Hours: (1) Mondays: 1:30 P.M. - 3:30 P.M.  
(2) Tuesdays: 1:30 P.M. - 3:30 P.M.  
(3) Wednesdays: 1:30 P.M. - 3:30 P.M.  
(4) Fridays: 1:30 P.M. - 3:30 P.M.

Note 1: The above office hours will not be applied to the final exam week. During the final exam, 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 CS286-002.

Class Meeting Room: EB-0140  
Class Meeting Days: Monday, Wednesday, and Friday  
Class Meeting Time: 11:00-11:50 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: 15%  
Programming assignments (6+11+8%): 25%  
Midterm Exam: 25%  
Final Exam: 35%  

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<thead>
<tr>
<th>Weight</th>
<th>Final Letter Grade</th>
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<tbody>
<tr>
<td>15%</td>
<td>100-92: A</td>
</tr>
<tr>
<td>25%</td>
<td>91-82: B</td>
</tr>
<tr>
<td>25%</td>
<td>81-72: C</td>
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<tr>
<td>35%</td>
<td>71-62: D</td>
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<td>Below 62: F</td>
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♦ Exams:
  - Exams will be closed textbook and closed notes.
  - Makeup exam will be given only for medical emergency (with a written proof).
  - Absence from an exam will result in zero point for the exam (except medical emergencies).
  - If you need any special assistance, you should contact to 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.

♦ Course Project:
  - 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).
  - The project specifications will be provided in the class.

♦ Quizzes:
  - There will be 12 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 CS286-002 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.

Attendance Policy:
  - Attendance will be taken on every lecture day (being late more than 5 minutes will be considered absence).
  - No penalty will be given up to three absences in a semester. For each absence beyond the third absence, -2 points will be applied to the next exam.
  - The above penalty will not be applied (only) to medical emergency (however, you need to provide written proof of medical service to waive the penalty).
✿ Academic Dishonesty:
Following activities (but not limited to them) will be considered academic dishonesty and final letter grade of F will be given:

- Submitting work (such as homework assignments and projects) totally or partially done by somebody else (this includes any human/electronic sources (such as web sites and even another course at SIUE)).
- Watching and copying your neighbors' solutions during quizzes and exams.
- Submitting program source code files (for the programming projects) that are developed by collaborations with other people.
- Using materials not allowed during quizzes and exams.

✿ 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

✿ Other Notices:
- Every student is expected to check "Weekly Notices" in CS286-002 home (follow the link from within "http://www.siue.edu/~hfujino") at least twice in a week.
- For any grading problem, each student is expected to contact the course instructor within 7 days after the grade is posted (failing to contact within 7 days will result in being unable to fix the problem).
- Contact Dr. Fujinoki within two weeks after your grades are posted, if you have any problem about your grades (e.g., quizzes, exams, attendances).
**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.

<table>
<thead>
<tr>
<th>Week #: Day</th>
<th>Topics</th>
<th>Reading Assignments</th>
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<tbody>
<tr>
<td><strong>Week 1:</strong></td>
<td>August 21 (M): Introduction to CS286</td>
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<td>August 23 (W): Computer Abstractions</td>
<td>Chapter 1 (1.1 through 1.5)</td>
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<td>August 25 (F): The Role of Performance</td>
<td>Chapter 2 (2.1 through 2.6)</td>
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<td><strong>Week 2:</strong></td>
<td>August 28 (M): Quiz #1, Introduction to Assembly Languages (1)</td>
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<td>August 30 (W): Introduction to Assembly Languages (2)</td>
<td>Chapter 3 (3.1 through 3.4)</td>
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<td>September 1 (F): Assembly Language using MIPS CPU Programming project description Project Phase #1 Assigned</td>
<td>Chapter 3 (3.1 through 3.4)</td>
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<td><strong>Week 3:</strong></td>
<td>September 4 (M): Labor Day Holiday. University closed.</td>
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<td>September 6 (W): Quiz #2, Program Control Structure</td>
<td>Chapter 3 (3.5 and 3.6)</td>
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<td>September 8 (F): Arithmetic for Computers (1)</td>
<td>Chapter 4 (4.1 through 4.6)</td>
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<td><strong>Week 4:</strong></td>
<td>September 11 (M): Quiz #3, Arithmetic for Computers (2)</td>
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<td>September 13 (W): Data Path and Control (1)</td>
<td>Chapter 5 (5.1 and 5.2)</td>
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<td></td>
<td>September 15 (F): Data Path and Control (2)</td>
<td>Chapter 5 (5.1 and 5.2)</td>
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<td><strong>Week 5:</strong></td>
<td>September 18 (M): Quiz #4, Programming Project #2 discussions (1) Handout</td>
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<td>September 20 (W): Programming Project #2 discussions (2) Handout</td>
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<td>September 22 (F): Pipeline Data Path (1)</td>
<td>Chapter 6 (6.1 through 6.3)</td>
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<td>Project Phase #1 Due</td>
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<td><strong>Week 6:</strong></td>
<td>September 25 (M): Quiz #5, Pipeline Data Path (2)</td>
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<td>September 27 (W): Pipeline Data Path (3)</td>
<td>Chapter 6 (6.1 through 6.3)</td>
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<td>September 29 (F): Pipeline Hazards and code optimization (1)</td>
<td>Chapter 6 (6.4 through 6.6)</td>
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<td><strong>Week 7:</strong></td>
<td>October 2 (M): Quiz #6, Pipeline Hazards and code optimization (2)</td>
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<td>October 4 (W): Pipeline Hazards and code optimization (3)</td>
<td>Chapter 6 (6.4 through 6.6)</td>
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<td>October 6 (F): Pipeline Hazards and code optimization (4)</td>
<td>Chapter 6 (6.4 through 6.6)</td>
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<td><strong>Week 8:</strong></td>
<td>October 9 (M): Quiz #7, Memory sub-system (1)</td>
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<td>October 11 (W): Midterm Exam Review</td>
<td>Chapter 7 (7.1 through 7.2)</td>
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<td>October 13 (F): Midterm Exam</td>
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<td><strong>Week 9:</strong></td>
<td>October 16 (M): Memory basics and memory hierarchy</td>
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<td>October 18 (W): Virtual Memory</td>
<td>Chapter 7 (7.1 through 7.2)</td>
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<td>Chapter 7 (7.4)</td>
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October 20 (F): Memory Segmentation Chapter 7 (7.4)

Week 10: October 23 (M): Quiz #8, Programming Project #3 discussions (1) Handout Project #2 Due
October 25 (W): Programming Project #3 discussions (2) Handout
October 27 (F): Cache Performance analysis Chapter 7 (7.3)

Week 11: October 30 (M): Quiz #9, Cache Performance analysis Chapter 7 (7.3)
November 1 (W): I/O Subsystems (1) Chapter 8 (8.1 through 8.3)
November 3 (F): I/O Subsystems (2) Chapter 8 (8.1 through 8.3)

Week 12: November 6 (M): Quiz #10, I/O Subsystems (3) Chapter 8 (8.5)
November 8 (W): I/O Subsystems (4) Chapter 8 (8.5)
November 10 (F): Multi-processor System (1) Chapter 9 (9.1)

Week 13: November 13 (M): Quiz #11, Multi-processor System (2) Chapter 9 (9.2)
November 15 (W): Multi-processor System: Hyper-Threadi Chapter 9 (9.2)
November 17 (F): NUMA and UMA memory architecture Chapter 9 (9.3)

Week 14: November 20 (M) – 24 (F): Thanksgiving Break. Classes not in session.

Week 15: November 27 (M): Quiz #12, Reliability of Hardware Components
November 29 (W): Capacity Analysis: Queuing Theory Project #3 Due
December 1 (F): Topic TBA

Week 16: December 4 (W): Topic TBA
December 6 (W): Final Exam Review (1)
December 8 (F): Final Exam Review (2)

Week 17: Final Exam Week
December 14 (Thursday) at 10:00-11:40 A.M.: Final Exam (comprehensive)

- 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