CS/ECE 3810: Computer Organization

Administrative Details and Syllabus
Fall 2017

Important Information

Class Website  www.learning2.eng.utah.edu (login required)
Lectures  Tuesdays and Thursdays 9:10-10:30a in L104 WEB
Instructor  D. Erin Parker, 3144 MEB
  Older editions of this textbook **may not be used.**

**Test Dates**  Mark your calendar – tests may not be missed!
  Test 1  Tuesday, September 26 (during class)
  Test 2  Tuesday, November 7 (during class)
  Final exam  Thursday, December 14 8-10a

Final course grade  Assignments 40%, Test 1 and Test 2 35%, Final Exam 25%
  Failing test/exam average → failing course grade

Prerequisites  Full-major status in CS, CE, or EE, and CS 1410

Getting help  The class website has details on how to see TAs and the instructor outside of class, as well as how to post questions to the class forum and email to the course staff.

Course Information

**Catalog Description.** CS/ECE 3810: Computer Organization is an in-depth study of computer architecture and design, including topics such as RISC and CISC instruction set architectures, CPU organizations, pipelining, memory systems, input/output, and parallel machines. Emphasis is placed on performance measures and compilation issues.

**More Information.** While most computer science and electrical engineering students will not end up designing computers, computer organization and design will play a major role in their careers. Understanding the hardware / software interface is important during the design of both hardware and software because design decisions made by hardware designers have significant impact on software engineering.

In CS/ECE 3810, we explore the relationship between software and hardware, examine the design of modern computers, and place an emphasis on understanding computer performance. Topics
covered include RISC instruction sets, number systems, the MARS simulator, digital logic, CPU
design, pipelining, the memory hierarchy and caches, storage, I/O, GPUs, and multicore issues.

Students taking this class should be proficient in C, C++, Java, or a similar programming language
(see the CS 1410 prerequisite). Students should understand discrete math, binary representations,
and have a robust math background.

Course Materials

Website. The class website is a Canvas course available through CIS. It is always under
development, with updates to the class schedule, lecture notes, assignment specifications, and more,
occuring regularly. It is critical that students become familiar with the class website right away
and plan to visit it several times a week, at a minimum.

Textbook. Regular reading and homework assignments are made from Computer Organization
Older editions of this textbook may not be used.

Lecture notes. The instructor will often make use of slides, sample problems, and other
materials during lecture. These items will be posted on the class website following the lecture;
however, such posted items may not represent completely the material covered in class. Students
who must miss class are strongly encouraged to check with a classmate.

Class tools and lab accounts. The CADE Lab (Linux in L224/226 WEB and Windows in
L210 WEB) has all of the hardware and software needed for this class. (You are not required to
purchase, install, or maintain any software to take this class – simply use the CADE Lab.) If you
do not have a CADE Lab account, or if you need your password reset, go to https://webhandin.
en.g.utah.edu/cade.

Students may use their own computers for completing assignments; however, broken tools or com-
puters, or network connectivity issues are not sufficient basis for an assignment deadline extension.
Plan ahead and use the lab computers if your own computer is not working.

Student Evaluation

Assignments. Weekly assignments are due on Tuesdays and made available to students at least
one week before the deadline. Each student must submit his/her solution to each assignment online
via the submission tool located with the instructions for that assignment before the posted deadline.
The work must be typed (no hand-written or scanned documents) and must be well written.

Pay attention to the file type required for each submission. Occasionally, MIPS programs and
Logisim files are to be submitted, and the appropriate file types are expected. For all written work,
only PDFs are accepted (no .doc, .zip, etc.).

It is the student’s responsibility to ensure the successful and timely submission of each assignment
— start early and follow the instructions carefully. Corrupted or missing files will not be grounds
for extensions — double-check your submissions and save a digital copy of all of your work. No
assignments will be accepted late, except in the case of a documented medical emergency.
All assignments are graded according to a six-tier scale of Excellent (100%), Great (95%), Good (85%), Fair (70%), Poor (50%), and Inadequate (1%). An explanation of the standards for each tier / rating will be given within the instructions for Assignment 1.

**Tests and final exam.** Tests will be given during class meetings on September 26 and November 7. The final exam is cumulative and will take place December 14 8-10a. *No test or the final exam may be taken at a different time for any reason other than a documented medical emergency.*

**Final course grade.** *If the average score for Test 1, Test 2, and Final Exam is 65% or lower, the final course grade will be no higher than a D+.* Otherwise, the final course grade will be based on assignments (40%), Test 1 and Test 2 (35%), and Final Exam (25%).

**Regrades.** Students who wish to appeal a score on an assignment or a test must do so *within one week of receiving the score* and use the *Regrade Request Form* posted on the class website.

**Drop score.** Students may miss an assignment deadline for a reason that is not granted an exception. Therefore, to allow for such an occurrence, the lowest score earned on an assignment is dropped from the record of each student at the end of the semester. Students should plan to use the “drop score” judiciously — there is only one for an assignment. *No test or final exam scores are dropped.*

**Letter grades.** The following table is used to associate numerical scores with the corresponding letter grade.

<table>
<thead>
<tr>
<th>Numerical Range</th>
<th>Letter Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>93 ≤ X &lt; 100</td>
<td>A</td>
</tr>
<tr>
<td>90 ≤ X &lt; 93</td>
<td>A-</td>
</tr>
<tr>
<td>87 ≤ X &lt; 90</td>
<td>B+</td>
</tr>
<tr>
<td>83 ≤ X &lt; 87</td>
<td>B</td>
</tr>
<tr>
<td>80 ≤ X &lt; 83</td>
<td>B-</td>
</tr>
<tr>
<td>77 ≤ X &lt; 80</td>
<td>C+</td>
</tr>
<tr>
<td>73 ≤ X &lt; 77</td>
<td>C</td>
</tr>
<tr>
<td>70 ≤ X &lt; 73</td>
<td>C-</td>
</tr>
<tr>
<td>67 ≤ X &lt; 70</td>
<td>D+</td>
</tr>
<tr>
<td>63 ≤ X &lt; 67</td>
<td>D</td>
</tr>
<tr>
<td>60 ≤ X &lt; 63</td>
<td>D-</td>
</tr>
<tr>
<td>X ≤ 60</td>
<td>E</td>
</tr>
</tbody>
</table>

**Getting Help**

To get help understanding course material, students may see the Teaching Assistants during *TA Consulting Hours*, see the instructor during *Office Hours*, post a question to the *Discussion Forum*, or send email to the course staff at teach-cs3810@eng.utah.edu. See the *How to Get Help* link on the class website for details.

**Course Guidelines**

All students are expected to maintain professional behavior, according to the University of Utah Student Code at [www.regulations.utah.edu/academics/guides/students/studentRights.html](http://www.regulations.utah.edu/academics/guides/students/studentRights.html). Students should read the Code carefully and know that they are responsible for the content. According to Faculty Rules and Regulations, it is the faculty responsibility to enforce responsible classroom behaviors, beginning with verbal warnings and progressing to dismissal from class and a failing grade. Students have the right to appeal such action to the Student Behavior Committee.

Students are expected to engage with the instructor and classmates during class meetings. Students are permitted to use a laptop or mobile device to take notes. *Use of a laptop or mobile device for any other purpose is not permitted, and students who do so will be asked to leave the classroom.*