CS 219: Computer Organization  
Computer Science & Engineering Department  
Spring 2016

Course Information:

- Credits: 3.0
- Lecture hours: Monday, Wednesday, Friday, 4:00 - 4:50 pm
- Instructor: Dr. Siming Liu, Research Assistant Professor, liusiming@nevada.unr.edu
- Office Hours: 11:00 AM - 12:00 PM, Mon. & Wed. (or by appointment); (SEM 203)
- TA: Bikash Poudel. Office Hours: Tue. 4:00 - 6:00 PM, bpoudel@nevada.unr.edu (SEM 342D)

Course Description:
Introduction to organization and integration of computer components. Topics include: computer abstractions and performance, arithmetic operations, instruction set architecture, assembly programming, datapath, pipelining, memory hierarchy, I/O, and parallel architectures.

Prerequisite(s): CS 202 or CPE 201

Textbook:

Reference book:

Course Objectives:
At the completion of this course, students will be able to:

1. Students will be able to describe the structure and functioning of a digital computer, including its overall system architecture, operating system, and digital components.
2. Students will be able to explain the generic principles that underlie the building of a digital computer, including data representation, digital logic and processor programming.
3. Students will be able to apply some fundamental coding schemes.
4. Students will be able to present and discuss simple examples of assembly language appropriate for an introductory course.
Holidays:
February 15, President’s Day
March 21, 23, 25, Spring Break
Number of Class Days (Tuesday, Jan. 19, through Wednesday, May 11): 14 Mondays, 16 Wednesdays, 16 Fridays = 46 days.

Course Outline and Topics:

1. **Computer Abstractions**
   • Components
   • Performance Evaluation

2. **Computer Instructions**
   • Instruction Set Architecture
   • Instruction Formats and Types
   • Addressing Modes
   • Flow of Control
   • MIPS: Assembly Language

3. **Computer Arithmetic**
   • Number Representation
     (Complementing System, Floating Point)
   • Addition and Subtraction
   • Multiplication
   • Division

4. **Processor**
   • ALU
   • Datapath
   • Pipeline
   • Hazard

5. **Memory (Hierarchy)**
   • Locality
   • Cache Design
   • Virtual Memory
   • Memory Access Performance

6. **Storage and I/O**
   • Disk and Flash Storage
   • Buses
   • Interface Protocols
   • I/O Performance

7. **Review**

Weeks 1, 2
Weeks 3, 4, 5
Weeks 6, 7 (Midterm)
Weeks 8, 9, 10
Weeks 11, 12
Weeks 13, 14
Week 15 (Final)
Student Participation

• **Disability Statement** If you have a disability for which you will need to request accommodations, please contact the instructor or someone at the Disability Resource Center (Thompson Student Services - 107) as soon as possible.

• **Important Policy** Surreptitious or covert videotaping of class or unauthorized audio recording of class is prohibited by law and by Board of Regents policy. This class may be videotaped or audio recorded only with the written permission of the instructor. In order to accommodate students with disabilities, some students may have been given permission to record class lectures and discussions. Therefore, students should understand that their comments during class may be recorded.

• **Academic Success Services** Your student fees cover usage of the Math Center (784-4433 or [www.unr.edu/mathcenter/](http://www.unr.edu/mathcenter/)), Tutoring Center (784-6801 or [www.unr.edu/tutoring/](http://www.unr.edu/tutoring/)), and University Writing Center (784-6030 or [www.unr.edu/writing_center/](http://www.unr.edu/writing_center/)). These centers support your classroom learning; it is your responsibility to take advantage of their services. Keep in mind that seeking help outside of class is the sign of a responsible and successful student.

Students are expected to attend all classes and read all of the assigned sections of the textbook. Often, material will not be covered in both lectures and reading assignments. Thus, both are essential to a full understanding of the course content. During most classes a short example problem related to the current topic will be assigned. Students will spend a few minutes working alone on this problem followed by a few minutes discussing their solutions with two or three other students. These solutions will be collected and used as a basis for up to 5% extra credit for the course grade.

**LATE HOMEWORK WILL BE ACCEPTED FOR AT MOST 50% CREDIT.**

Students are encouraged to study together, but each person must prepare his or her solutions and have a firm understanding of any work turned in. When you put your name on your homework you are stating that it is your own work and not the work of another person. As a reminder of UNR academic standards, please read from the UNR online Catalog, University Code of Conduct and Policies, POLICIES AND GUIDELINES, ACADEMIC STANDARDS [http://www.cis.unr.edu/ecatalog/Defaul.aspx?article_list_id=29351](http://www.cis.unr.edu/ecatalog/Default.aspx?article_list_id=29351) defining these standards. Specifically, the following: “Plagiarism is defined as submitting the language, ideas, thoughts or work of another as one’s own; or assisting in the act of plagiarism by allowing one’s work to be used in this fashion.” This means that if another student asks to borrow your work to copy - JUST SAY NO - or you are participating in plagiarism.

Course Grade Structure

• Each course activity will contribute to the course grade as shown below. All activities will be graded on a scale of 0-100 points, and the final course grade will be determined as shown below.

• All exams given in this course will be closed notes and closed books. Only calculators and materials handed out at the time of the exam may be used. Normally, plus/minus grades are not given in this class. The instructor reserves the right to assign plus/minus grades under special circumstances involving borderline grades based upon class participation. Your grade will never be lower than defined here unless you have an excessive number of un-excused absences from class, however, positive class participation can be used as a basis for raising your grade.
Grade Distribution:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework</td>
<td>40%</td>
</tr>
<tr>
<td>Midterm</td>
<td>30%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>30%</td>
</tr>
</tbody>
</table>

90 - 100 points = A | 80 - 89 points = B | 65 - 79 points = C | 50 - 64 points = D | 00 - 49 points = F

Statement on Academic Dishonesty
Cheating, plagiarism or otherwise obtaining grades under false pretenses constitute academic dishonesty according to the code of this university. Academic dishonesty will not be tolerated and penalties can include canceling a student’s enrollment without a grade, giving an F for the course or for the assignment. For more details, see the University of Nevada, Reno General Catalog at [http://catalog.unr.edu/](http://catalog.unr.edu/).

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