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|  | **Syllabus** |  |

**CSCI 231 Computer Systems & Organization**

**Fall 2018**

**Section 1 (Green Hall) - S. Saginbekov and J. Park 13:00 – 13:50 Monday, Wednesday**

**Lab Section 1 (7.522) - S. Saginbekov and J. Park 13:00 – 13:50 Friday**

**Lab Section 2 (7.522) - S. Saginbekov and J. Park 14:00 – 14:50 Friday**

**Lab Section 3 (7.522) - S. Saginbekov and J. Park 15:00 – 15:50 Friday**

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**Course Objective & Learning Outcomes**

The objective of this course is to give students an in‐depth understanding of how a computer is organized and designed as well as to familiarize them with tradeoffs at the hardware/software interface.

After taking and successfully passing this course,

* the students will be able to understand how a computer is organized and designed
* analyze computer systems (or subsystems) and compare them based on performance and cost
* understand how high level languages are executed on computer hardware
* program in assembly language using the MIPS instruction set architecture
* understand the concept of a memory hierarchy and caching
* incorporate and integrate all of the above into designing and evaluating a system

**Course Materials**

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| |  |  | | --- | --- | | http://img.docstoccdn.com/thumb/orig/160214869.png | * The primary text for the course is available in the library:   Computer Organization and Design, revised 4th edition  Patterson & Hennessy  Morgan Kaufmann ISBN: 978-0-12-374750-1 | |

* Extensive on-line digital resources (readings, references, tutorials) will be utilized throughout the course.
* The required software is installed on the lab machines, and most of it is available for free download to personal machines.

**Class Structure**

The model of instruction will emphasize a blend of lecture, presentation, demonstration, and hands-on exercises. The class meetings will be conducted in a hybrid computer lab, designed to accommodate the full range of course activities.

A total of three homework assignments will be distributed. Time for completion of a homework assignment is one/two weeks. Live grading *may* need to be done with the instructor within one week from the submission deadline. Late work will not receive credit, as solutions are frequently reviewed in class or distributed via moodle. Each homework assignment may be weighted differently, based on its difficulty

Attendance to class sessions is compulsory. Exercises will be given regularly as classwork. Generally, the lab exercises will be taken directly from recent topics (from the reading, homework, or presentations), and are designed to reinforce specific skill sets related to the topic.

There will be two/three in-class quizzes, at regular intervals throughout the term, a midterm exam, and a final exam conducted during the official exam week. Students who miss assignments or exams for medical reasons are required to submit a doctor’s note and make individual arrangements for make-ups. Arrangements for make-ups for other types of emergencies or conflicts should be discussed with the instructor as early as possible.

**Course Assessment**

The final grade is calculated as follows:

* Homework: 10%
* Classwork: 15% ± 
* Attendance 10% ± 
* Quizzes: 10%
* Midterm: 25%
* Final Exam: 30%

**Grading Scale:**

A 95 or above

A- 90 up to 95

B+ 85 up to 90

B 80 up to 85

B- 75 up to 80

C+ 70 up to 75

C 65 up to 70

C- 60 up to 65

D+ 55 up to 60

D 50 up to 55

F 0 up to 50

**Course Outline**

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|  | **Week of** | **Topics** | **Readings** |
| 1 | 13.08 | Chapter 1  Introduction | Chapter 1 |
| 2 | 20.08 | Chapter 2  Instruction Set, Operations and Operands, MIPS assembly language fundamentals, Memory Access | Chapter 2  http://courses.missouristate.edu/kenvollmar/mars/ |
| 3 | 27.08 | Logical Operations, Instructions for Making Decisions |  |
| 4 | 03.09 | Supporting Procedures in Computer Hardware |  |
| 5 | 10.09 | Performance Syscalls, Input/Output |  |
| 6 | 17.09 | Chapter 3  Arithmetic operations, Floating Point Representation, FP Arithmetic | Chapter 3 |
| 7 | 24.09 | Midterm review  **Midterm Exam** |  |
| 8 | 01.10 | MIPS: system calls and memory allocation |  |
| 9 | 08.10 | **Fall break** |  |
| 11 | 15.10 | FP instructions in MIPS MARS bitmap display |  |
| 12 | 06.11 | Chapter 5  Memory Hierarchy | Chapter 5 |
| 13 | 13.11 | Basics of Caches,  Virtual Machines |  |
| 14 | 20.11 | Recursion  Storage and Heap |  |
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**Topic and assignment schedule is subject to change.**

**Academic Integrity**

Nazarbayev University and The School of Science and Technology have established high standards for academic integrity, using an approach in which students are trained to produce original work according to professional standards, and to properly cite and reference the work of others when it is appropriate to do so.

The specific guidelines are published in the NU Student Handbook. In particular,

* The assignments in this class are designed to introduce important concepts and techniques, and enable you to explore the material independently so as to gain insight and comprehension of the subject. Doing the work is much more important than getting the right answer.
* The course is designed such that each new week’s material builds on the skills developed in the preceding week, thus, any action that interferes with this process (missing class, skipping the assignment, copying) will seriously impede your progress.
* You are welcome—and encouraged—to talk through concepts and ideas with your fellow students and to study with them, but do not give or receive direct help from your classmates on a graded assignment.
* Homework should be completed individually. If you distribute your work to others, even if you are not intending them to copy it, this is still considered academic misconduct.
* Even the appearance of cheating or inappropriate copying should be avoided.
* Students should be aware that the homework submission process incorporates an automated plagiarism detector.
* You may only get help on graded assignments from designated people—the professors or TAs for the course. If you are struggling with an assignment, by all means, please seek help from them.

In the event that academic misconduct such as plagiarism or cheating is discovered, the student will receive no credit for the work, and the event reported to the Senior Administrator for Students. Egregious cases, or a second offense, can result in failure of the course and potential suspension or expulsion from the university.

When a student suspects that another student has violated the academic honesty policy, a report should be made to the appropriate faculty member.

**Behavior**

Students are expected to maintain respectful decorum in the classroom and laboratories, and in all interactions with fellow classmates, Teaching Assistants, Research Assistants and NU faculty and staff. Class time is short, and valuable, and thus should be used effectively; students are expected to refrain from such distractions as texting, phone calls, on-line chats, personal web browsing, the use of social networking sites, and excessive chatting or greetings during class time.

Students should come to class well-prepared, having completed the background reading and related assignments, and possessing proper resources for the class meeting (books, paper, writing implements, computers, etc.), as needed.