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|  | **College of Engineering and Applied Sciences**  **Department of Computer Science** |

**ICSI 404**

**Computer Organization**

**(Spring 2020)**

**Class Meeting Time: M,W 4:15 – 5:30**

**Location: ES241**

**INSTRUCTOR**

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| Instructor’s name | Michael Phipps |
| Instructor’s title | Lecturer |
| Office location | UAB440 |
| Office hours | M, W 1:00 – 3:30 |
| E-mail address | mphipps@albany.edu |

**TEACHING ASSISTANTS / PEER EDUCATORS** (AND LAB/DISCUSSION SCHEDULE, if any)

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| TA’s / Peer educators | | Boya Ma, Yi Wei | |
| TA’s office location | | Boya – Info Commons in Science Library, Yi – UAB415 | |
| TA’s office hours (if any) | | Boya – Tu, Th 2:30 – 3:50; Yi-Tues 3-5 | |
| TA’s email addresses | | [bma@albany.edu](mailto:bma@albany.edu)  [ywei2@albany.edu](mailto:ywei2@albany.edu) | |

**REQUIRED TEXTBOOK**

No textbook is REQUIRED for this class, but I recommend any of the “Computer Organization and Design” books from Hennessy and Patterson.

**COURSE DESCRIPTION / OVERVIEW**

An introduction to the logical organization of the hardware components of computing systems. Topics include logic design from a functional point of view, data representation and processing, description of major components such as the central processing unit and memory, and control and communication within the components and in the system.

PREREQUISITES/COREQUISITES

ICSI210 and ICSI333

**LEARNING OBJECTIVES / OUTCOMES**

At the completion of this course, the student will:

* + Have a deeper understanding of assembly language
  + Understand how to design efficient digital circuits
  + Understand how circuits are used to construct memory and processors
  + Understand common performance techniques such as pipelining and out of order execution
  + Be able to compare and contrast computer designs
  + Understand the work that an assembler does
  + Understand how to emulate a simple CPU using a virtual machine

The topics that will be covered in this course are provided at the end of the syllabus.

**COURSE WEBSITE AND BLACKBOARD**

Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained. However, this is not an online course and class attendance and participation is essential and required.

**ASSESSMENT AND POLICIES**

***No late assignments will be accepted.***

***Academic dishonesty is an automatic ‘E’ in the course.***

***You have one week (7 days) from when an assignment is graded to dispute the grade.***

Exams: One exam (final) will be given. A portion of the class period preceding the exam will be utilized for a review session.

Project / Labs / Assignment: Projects / labs / assignments will be assigned and will be conducted out of class. They will be graded on a 100-point scale and will be totaled together to account for 80% of the final grade.

Final Project: A final project will not be required.

Grading

A final grade will be determined as a weighted average of the following assignments:

* Programming Projects/Assignments (80%)
* Final Exam (20%)

Grading Scale

A: 100-95 points A-: 94-90 points

B+: 89-87 points B: 84-86 points B-: 80-83 points

C+: 79-76 points C: 75-70 points

D: 69-60 points

E: 59 points and below

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, “…students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned.” purpose of improving their grades once the course has been completed and final grades assigned.”

**Attendance/Lateness/Use of Computers in class**

Students are expected to attend every class and to arrive on time. Please DO NOT disrupt the class by entering late or leaving early. Computers may be used during class for note taking as long as the use is not disruptive or distracting. **Other electronic devices should be put away during class**.

Also see http://www.albany.edu/health\_center/medicalexcuse.shtml.

**Responsible Computing**

Students are required to read the University at Albany Policy for the Responsible Use of Information Technology (https://www.albany.edu/its/its\_policies.htm). Students will be expected to apply the policies discussed in this document to all computing and electronic communications in the course.

**Students With Disabilities**

Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 130, 442-5490). That office will provide the course instructor with verification of your disability, and will recommend appropriate accommodations. For further information refer to the University’s Disclosure Statement regarding Reasonable Accommodation found at the bottom of the document at the following website: <http://www.albany.edu/disability/docs/RAP.doc>. This website can be reached by following the link under “Reasonable Accommodation Policy” at the following webpage [http://www.albany.edu/disability/faculty-staff.shtml.](http://www.albany.edu/disability/faculty-staff.shtml)

**Academic Honesty and Overall Regulations**

Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity, and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the University Bulletin (https://www.albany.edu/undergraduate\_bulletin/regulations.html).

***CAUTION AND A STRONG WORD OF WARNING!!!! Plagiarism and other acts of academic dishonesty will be punished. Students are expected to submit original work. While you may discuss a problem with another student, the work you submit must be your own. Any student who submits copied work or any student that provides work for copying will an E for the class. As per college policy, cheating activity, including cheating in exams, quizzes, projects, etc., WILL be written up in a Violation of Academic Integrity Report (VAIR) reported to the college administration, which includes the Computer Science Chair, the College of Engineering and Applied Sciences Dean, and the Vice Provost of Undergraduate Studies. This will become a part of your permanent record. Multiple incidents will result in being expelled from the college.***

COURSE OUTLINE AND READINGS:

The following schedule of lecture topics and reading assignments is preliminary and may be changed as the semester progresses. The final schedule and specific assignments will be discussed in class.

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| Class | Topic | Notes |
| Wednesday, January 22, 2020 | Intro to Course |  |
| Monday, January 27, 2020 | Refreshers |  |
| Wednesday, January 29, 2020 | Refreshers |  |
| Monday, February 3, 2020 | Assembly Language |  |
| Wednesday, February 5, 2020 | Assembly Language |  |
| Monday, February 10, 2020 | SIA Documents | Unit Test Assignment Given |
| Wednesday, February 12, 2020 | Digital Logic |  |
| Monday, February 17, 2020 | Memory |  |
| Wednesday, February 19, 2020 | Memory |  |
| Monday, February 24, 2020 | Caches | Assembler Assignment given |
| Wednesday, February 26, 2020 | Caches |  |
| Monday, March 2, 2020 | Caches |  |
| Wednesday, March 4, 2020 | Caches |  |
| Monday, March 9, 2020 | MicroArchitecture |  |
| Wednesday, March 11, 2020 | MicroArchitecture | Virtual Machine Assignment |
| Monday, March 16, 2020 | Spring Break |  |
| Wednesday, March 18, 2020 | Spring Break |  |
| Monday, March 23, 2020 | Pipelines |  |
| Wednesday, March 25, 2020 | Pipelines |  |
| Monday, March 30, 2020 | Out Of Order |  |
| Wednesday, April 1, 2020 | Out of Order |  |
| Monday, April 6, 2020 | Out of Order |  |
| Wednesday, April 8, 2020 | SMP |  |
| Monday, April 13, 2020 | SMP |  |
| Wednesday, April 15, 2020 | Instructions | Pipeline Assignment given |
| Monday, April 20, 2020 | Instructions |  |
| Wednesday, April 22, 2020 | Instructions |  |
| Monday, April 27, 2020 | Instructions |  |
| Wednesday, April 29, 2020 | GPUs |  |
| Monday, May 4, 2020 | Review |  |