IC220 Computer Architecture & Organization (3 credits)
Course Policy, Spring AY20

Instructors:
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Course Description: This course introduces students to performance metrics, instruction set architectures, assembly language, logic design, memory hierarchies, and pipelining.

Credits: 3-0-3

Learning Objectives:

1. Critically evaluate the performance of computer systems
2. Discuss modern trends and challenges in computer system design (supports Student Outcome (3));
3. Understand how assembly language instructions are represented and executed by a processor;
4. Write short, procedural assembly language programs;
5. Understand the function call stack, its proper operation, common vulnerabilities, exploits, and defenses;
6. Specify and minimize digital logic (supports Student Outcome (2));
7. Describe how the datapath and control work together in a processor to execute a program;
8. Describe the memory hierarchy and be able to evaluate strategies for improving its performance;

Student Outcomes:
Graduates of the program will have an ability to:

- (Outcome 2) An ability to design, implement, and evaluate a computer-based solution to meet a given set of computing requirements in the context of the discipline.
- (Outcome 3) An ability to communicate effectively with a range of audiences about technical information.

Textbook: Computer Organization and Design: The Hardware/Software Interface, **ARM Edition**, David A. Patterson and John L. Hennessy, Morgan Kauffman Publishers. A must have!
Please note this is NOT the same as previous years -- you must have the **ARM version**, not the older version with MIPS!!!
Reading assignments are from the text, and may be supplemented by handouts or additional assignments. Class lectures will discuss or review SOME of the material presented in these assignments, however to use class time most efficiently **some of the material in the assignments will not be explicitly covered during the class periods**. You are responsible for the whole assignment.

Extra Instruction: Extra Instruction (EI) is available and encouraged when your own attempts to understand the subject matter are unsuccessful. However, you must come prepared with specific questions or areas to be discussed (i.e. have read the assigned readings). If you have missed class, get the notes from a classmate first. See course webpage for details regarding how to schedule EI with your instructor. Although students may show up at the instructor's office without appointment, no expectation of instructor availability should be assumed. Email questions are also encouraged, though in some cases the reply will request in-person EI as the most effective solution.

Collaboration/Honor: The guidance in the Honor Concept of the Brigade of Midshipmen and the Computer Science Department Honor Policy must be followed at all times. See:

`www.usna.edu/CS/resources/honor.php`

Specific instructions for this course:

- **Homeworks and labs:** Unless otherwise specified, you may discuss homeworks and labs as much as you like with other students, provided that:
    1. You must clearly identify those that you collaborated with when turning in the assignment.
    2. You must fully understand all of the techniques and solutions in your homework.
    3. The actual pencil-to-paper or fingers-to-keyboard effort must be your own. Sharing files or parts of files between students is not permitted.
    4. Complete all homework **before** entering the classroom on the due date.
- **Quizzes and exams:** individual effort only.
- **Course paper:** you must research and write an original, new paper (specifically for IC220) by yourself. You may, however, discuss ideass with others and/or show drafts of your paper to others to request constructive feedback. You may not read another midshipman's IC220 paper if their paper is on the same topic as yours.
- **Projects:** individual effort only. Acceptable resources are your textbook, course notes, the IC220 website, other websites specifically linked to by the IC220 website, and your instructor. Unless otherwise specified in writing, other sources, human or not, printed or online, are prohibited.

Midshipmen may not give *or* receive any unauthorized assistance.
Any cheating (including the receiving or giving of unauthorized assistance) will result in, at a minimum, a grade of zero on the offending assignment, quiz, or exam. All offenses **will** be reported to the Honor system.

Classroom Conduct: The section leader will record attendance and bring the class to attention at the beginning and end of each class. If the instructor is late more than 5 minutes, the section leader will keep the class in place and report to the Computer Science department office. If the instructor is absent, the section leader will direct the class. Drinks are permitted, but they must be in reclosable containers. Food, alcohol, smoking, smokeless tobacco products, and electronic cigarettes are all prohibited. Cell phones must be silent and stowed during class. Visit the head before class if needed.

Late Policy: Penalties for late submission of graded work may vary among courses or from semester to semester, but they will be the same for all sections of a given course. For *this* course: credit depends upon when an assignment is submitted:

- For projects and papers:
    - Full credit (submitted promptly at start of class on the due date, or by 0800 if no class that day)
    - -15% (submitted by 0800 on the first business day after the deadline)
    - -30% (submitted by 0800 on the second business day after the deadline)
    - No credit (submitted after that. Recall all assignments must be submitted to possibly earn a passing grade)
- For homeworks and labs:
    - Full credit (submitted promptly at start of class on the due date, or by 0800 if no class that day)
    - No credit (submitted after that. Recall all assignments must be submitted to possibly earn a passing grade)

Grading:

	6 weeks	12 weeks	Final
Homework/Quizzes/Labs	15%	15%	15%
Projects/Papers	20%	20%	20%
6 Week Exam	65%	32%	15%
12 Week Exam		33%	15%
Final Exam			35%

Assignments are a vital part of student learning for this course. Consequently, **to possibly receive a passing grade** at 6-weeks, 12-weeks, or End-of-term, all homeworks, labs, and projects due to-date must be submitted (and substantially complete), even if the deadline for receiving credit on those assignments has passed.

Class participation is encouraged and expected. The instructor reserves the right to adjust the composite grade by as much as two points based on class participation.

Exams: All exams are effectively cumulative, though the 12-week exam emphasizes material covered since the previous exam. The final exam will be cumulative.

Absences: Students are responsible for obtaining any material missed due to an absence (notes, handouts, etc.) from the instructor, class web site, section leader or classmates. Additionally, students must ensure that their work is submitted by the deadline regardless of other commitments, i.e. duty, sick call, movement orders. Should bona fide emergencies arise, it is the responsibility of the student to coordinate with the instructor **before the relevant deadlines**.