IC411 Operating Systems
Course Policy, Fall AY20

Coordinator: Prof. Rick Schlichting, x3-6805, schlicht@usna.edu
Instructor: CAPT Michael Bilzor, USN

Course Description: The study of the operating system as a resource manager. This course begins with a brief overview of major evolutionary changes in OS design, then explores the interface between the OS and the architecture. It continues with discussions of processes, threads, concurrency, and synchronization, including scheduling and deadlock. Memory, I/O and files, security, and virtualization are also covered.

Credits: 3-0-3

Learning Objectives:

- Interface. Understand the interface between a computer's architecture and an operating system.
- Process/Execution. Understand the components and operation of processes and threads. Understand how the system loads and lays out the process in memory. Analyze and assess process execution, security and exploitation.
- Concurrency. Explain the principles of mutual exclusion and synchronization of running processes. Describe and be able to implement strategies for detection, avoidance, and prevention of process deadlock and starvation. Be able to solve problems in a multi-threaded programming environment. (supports CS/IT Student Outcome 1)
- Memory. Explain the operation of a typical memory hierarchy, and the associated design tradeoffs.
- Scheduling. Explain typical operating system scheduling concepts and algorithms.
- I/O and Files. Understand input and output, such as disk and network I/O, from the perspectives of both the OS and the programs/applications.
- Security. Understand information system vulnerabilities, system level defenses, and information assurance and security principles and practices. (supports CS/IT Student Outcome 1)
- Virtualization. Describe the different types of operating system virtualization, and how they work.

Student Outcomes:

1. An ability to analyze a problem, and to identify and define the computer requirements appropriate to its solution

Textbook: *Modern Operating Systems*, 4th Edition, Tanenbuam & Bos, Pearson, 978-0-13-359152-0.

Extra Instruction: Extra instruction (EI) is always available, and everyone is encouraged to take advantage of it. EI is not a substitute lecture, however. Have your notes with you and specific questions in mind. If you miss class, get the notes from the section leader or another classmate.

Collaboration: 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:

- Homework and Labs: Collaborative conversations with regard to strategies, techniques, and solution methods for completing homework and labs are allowed. However, design and implementation must be the work of the individual student handing in the final product; the actual pencil-to-paper and coding must be your own. Any collaboration must be documented (name(s) and brief summary of collaboration). All submissions must be individual, unless otherwise specified. Actual code and written answers may not be shared with others or copied (in writing or electronically), but strategies, techniques, and solution methods may be discussed. Solutions based on online references must be documented. Also, you may not use material or copy answers from previous semesters of this course.
- Exams: Exams will normally be closed book, individual effort. Use of notes and other materials will be at the discretion of instructor, but the default is no outside material of any kind.

All collaboration and outside sources should always be cited. The same rules apply for giving and receiving assistance. If you are unsure whether a certain kind of assistance or collaboration is permitted, you should assume it is not, work individually, and seek clarification from your instructor.

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 during class, and not be a distraction to the owner or others.

Late Policy: Penalties for late submission of graded work for this course is as follows:

- Homework or labs submitted late will have their final graded score reduced by 25% for each 24 hours past the due date and time.
- Fractional days will be rounded up, weekends included.
- Work will not be accepted more than 2 days late without prior instructor consent.

Grading: Grades during the semester will be determined as following, subject to adjustment.

| | 6 weeks | 12 weeks | 16 weeks |
|---|---|---|---|
| Homework | 30% | 30% | 30% |
| Labs | 30% | 30% | 30% |
| 6-wk exam | 40% | 20% | 20% |
| 12-wk exam | | 20% | 20% |
| | | | |
| Total | 100% | 100% | 100% |

The final grade will then be 0.8 times the percentage score for 16 weeks + 0.2 times the percentage score on the final exam

Approved:

CAPT M. Bilzor, USN