

"Concurrent & Distributed Systems"

Spring 2018: Mondays & Wednesdays, 3:00pm-4:15pm, Room 3, Lecture Hall

Instructor: Prof. Jonathan Bell

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Office Hours: Anytime electronically, Mondays & Wednesdays 2:15-3:00pm, or by appointment

Contacting:

[Please post on Piazza](#) for course-related inquiries.

Pre-Requisites:

Students are required to have previously taken CS 367 (Computer Systems & Programming).

This is a programming intensive course. You need to be comfortable with programming in Java to be able to do the programming assignments (note: this semester, all assignments will be in Java). It is also not a good idea to take this class if your course/work schedule is already quite full.

Objectives:

The class focusses on issues that arise in the design and implementation of concurrent and distributed applications. Course work will involve several programming assignments.

Learning Outcomes:

- Demonstrate an ability to design and implement concurrent programs
- Demonstrate an understanding of the fundamental concepts in synchronizing concurrent processes and threads by using locks, semaphores and monitors
- Demonstrate an ability to design and implement distributed programs using current middleware technologies
- Demonstrate an understanding of the fundamental concepts underlying distributed programming including message passing and remote procedure calls

Readings:

Unfortunately there is no single textbook that covers all the material that will be discussed in this class. The following three books are recommended (not required):

- Randal Bryant & David O'Halloran. Computer Systems: A Programmer's Perspective, Prentice Hall, 1st edition (2003) or 2nd edition (coming out February 2010)
- M.L. Liu, Distributed Computing: Principles & Applications, Pearson Education, 2004.

ISBN 0-201-79644-9

- Richard Carver and K. C. Tai. Modern Multi-threading, John Wiley, 2006. ISBN 0-471-72504-8

Topics:

The following topics will be covered:

1. Multi-threaded/Concurrent Programming
2. Distributed Systems
3. Client-Server Applications
4. Middleware technologies
 1. TCP/IP Sockets
 2. RPC/RMI
 3. Web Services (SOAP, XML)
5. Advanced topics (time permitting) - Peer to Peer Computing, Parallel Programming

Grading:

There will be four programming assignments (two dealing with concurrent programming and two with distributed/networked applications). The software required for these projects is available on the computers in the IT&E Lab. You can also do the projects on your own computer. (The programming assignments involve programming in Java on a UNIX/Linux platform.) You must do the programming assignments individually.

50% Programming Assignments

10% Participation and in-class activities

15% Midterm Exam

20% Final Exam

Homework policy

Students must work individually on all homework assignments. We encourage you to have high-level discussions with other students in the class about the assignments, however, we require that when you turn in an assignment, it is only your work. That is, copying any part of another student's assignment is strictly prohibited. You are free to reuse small snippets of example code found on the Internet (e.g. via StackOverflow) provided that it is attributed. If you are concerned that by reusing and attributing that copied code it may appear that you didn't complete the assignment yourself, then please raise a discussion with the instructor.

10% will be deducted for late HW assignments and late HW assignments will only be accepted for 24 hours after the due date. **HW assignments submitted more than 24 hours late will receive a zero.** If you're worried about being busy around the time of a HW submission, please plan ahead and get started early. **Homework that does not compile or run will receive at most 50% credit.**

For fairness to all, there are no exceptions to the above rules.

In Class Activities:

Most lectures will feature interactive activities that support the material being presented. Some lectures will include very brief multiple choice quizzes, meant primarily to help me understand how well you (and the class as a whole) are understanding the material that day. These quizzes will be graded on a "did it" or "didn't" basis: you either take the quiz, and you get the marks, or you did not take the quiz, and do not get the marks (that is, as long as you answer the questions, you get full credit, regardless of what the answers are). You must be present in class to take the quiz (participating in an online quiz remotely will be considered an honor code violation).

You are strongly encouraged to bring your laptop or phone to class so that you can participate. Your 10% participation grade is based on attendance and participation in in-class activities.

Honor Code:

GMU is an Honor Code university; please see the [Office for Academic Integrity](#) for a full description of the code and the honor committee process, and the Computer Science Department's [Honor Code Policies](#) regarding programming assignments. The principle of academic integrity is taken very seriously and violations are treated gravely. What does academic integrity mean in this course? Essentially this: when you are responsible for a task, you will perform that task. When you rely on someone else's work in an aspect of the performance of that task, you will give full credit in the proper, accepted form. Another aspect of academic integrity is the free play of ideas. Vigorous discussion and debate are encouraged in this course, with the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas, perspectives, and traditions. When in doubt (of any kind) please ask for guidance and clarification.

Accommodations for Disabilities:

If you have a documented learning disability or other condition that may affect academic performance you should: 1) make sure this documentation is on file with Office for Disability Services (SUB I, Rm. 4205; 993-2474; <http://ods.gmu.edu>) to determine the accommodations you need; and 2) talk with me to discuss your accommodation needs.

Privacy:

Students must use their MasonLIVE email account to receive important University information, including messages related to this class. See <http://masonlive.gmu.edu> for more information.