

## **CMSC 461: Senior Capstone in Computer Science (3 credits) Spring 2016**

**Instructor:** Robert Marmorstein, 395-2185, marmorsteinrm@longwood.edu

**Lecture:** 3:00pm-3:50pm MWF, Ruffner 354

**Office Hours:** 1:30pm-3:50pm TWR, Ruffner 329 or by appointment

**Course Web Site:** <http://marmorstein.org/~robert/Spring2016/cs461.html>

### **Course Description:**

A capstone course designed to consolidate experiences from a variety of other courses by working in groups on one or more large projects. Principles of software engineering will be covered, including traditional and object-oriented software design, software lifecycle models, software analysis, and management implications. The implementation of developing software using teams will be stressed along with various software tools. Reusability, portability, and interoperability will be discussed. A segment on assessment will be included.

**This course is Speaking Intensive.**

**Prerequisite:** Senior Standing.

### **Course Objectives:**

This course has two main themes: software engineering (the ability to collaborate to develop large software projects) and career preparation. To accomplish these, you will:

- \* Prepare for the job search by developing a resume and cover letter
- \* Review elements of programming and discrete mathematics
- \* Review fundamental data structures and algorithms of computer science
- \* Master tools and procedures used for managing large projects
- \* Make at least one significant contribution to an open source project

### **Textbook:**

This course has two required textbooks:

Programming Interviews Exposed, 3<sup>rd</sup> edition, by John Mongan, Noah Suojanen, and Eric Giguere, Wrox Press, ISBN: 978-0470121672

Beginning Software Engineering, Rod Stephens, Wrox Press, March 2015, ISBN: 978-1-118-96914-4.

### **Course Requirements:**

A significant part of your grade (50%) will be earned by completing the semester project. Failure to complete this project successfully will result in a failing grade even if your numeric grade is high enough to pass the course.

The remainder of your grade will come from short laboratory homework assignments and quizzes(20%), review projects (10%), a semester presentation (10%) and completion of the Final Exam(10%).

**Grading Policy:**

Late work will not be accepted unless you have a medical condition or family emergency which prevents you from completing the assignment on time. However, I allot three slip days at the beginning of the semester which you may use to extend the due date of one or more review projects. In the event of a medical or family emergency, you do not need a doctor's note, but you must contact me by e-mail as soon as possible to arrange an extension. In such cases, I may, at my option, extend the due date on the project or grant you additional slip days.

**Grading Scale:**

Letter grades will be assigned using the following scale. Note that there is no grade of D- in this class.

	A: 91-99	A-: 90
B+: 89	B: 81-88	B-: 80
C+: 79	C: 71-78	C-: 70
D+: 69	D: 64-68	F: Below 64

**Attendance:**

I expect you to attend class unless you are sick or engaged in a school sponsored sports event or extra-curricular activity. I will rely on your honor to enforce the attendance policy. In accordance with Longwood policy, missing more than 10% of scheduled class time to unexcused absences may result in loss of one letter grade. Missing more than 25% of class (whether excused or unexcused absences) may, at my discretion, result in a failing grade.

**Food and Drink:**

I prefer that you do not eat in class (it distracts me and the other students). You may bring water or other non-alcoholic beverages to class. I occasionally make exceptions to this rule for students who would otherwise miss a meal or who have medical needs. If you feel that you need such an exception, you **MUST** make arrangements with me before you bring food to class. Violations of this policy will be considered an unexcused absence.

**Cell Phones and Laptops:**

Cell phones and laptops must be turned off and put away during lecture, unless I have specifically requested, usually by e-mail, that you bring them to class (e.g. for a lab day). Violations of this policy will be considered an unexcused absence.

**Honor Code:**

I take the honor code seriously in my classes. Students suspected of an honor code violation will be charged with honor offenses. Any student convicted of an honor offense will receive an F in the course in addition to any penalties imposed by the honor council.

All work in this class should be considered pledged. Tests and quizzes must be completed entirely on your own and will be taken closed-book and closed-notes. You *may* discuss homework problems and laboratory projects with other students subject to the following restrictions:

1. Your submitted work must consist of *your own answers in your own words* which you have typed or written yourself. You may discuss assignments verbally with other students, but do not share code or answers electronically.
2. You must acknowledge any help you receive from anyone outside your group, including any discussion of the homework problems, by leaving a short note in the margin of the assignment, or in the case of a project, placing appropriate comments in the code. Such acknowledgements should indicate which section or sections of your work you have discussed.
3. Do not copy large blocks of code or directly copy answers from other students, the Internet, or other resources. You can discuss the general approach to an assignment and you can help other students find syntax errors in their code, but any block of code longer than two or three lines should be entirely your own work.

### **Mandatory Reporting of Crimes and Sexual Misconduct**

In accord with its history and mission, Longwood University believes that each individual should be treated with respect and dignity and that any form of crime or violence is incompatible with Longwood's commitment to the dignity and worth of the individual. Longwood University is committed to providing a healthy living, learning and working environment which promotes personal integrity, civility and mutual respect. If you have been the victim of a crime or sexual misconduct we encourage you to report this. If you disclose this to a faculty member or employee (with the exception of our Limited Reporting and Confidential Reporting Resources; for example, the Counseling and Psychological Services (CAPS) staff), they are required by law to notify the appropriate University officials. The faculty member or employee cannot maintain complete confidentiality and is required to report the information that has been shared. Please know that all reported information is treated with discretion and respect and kept as private as possible. For more information about your options at Longwood:

<http://www.longwood.edu/titleix>  
<http://www.longwood.edu/police/crimereports.htm>  
<http://www.longwood.edu/studentconduct/12050.htm>

or contact Jen Fraley([fraleyjl@longwood.edu](mailto:fraleyjl@longwood.edu)), Associate Dean of Conduct and Integrity.

### **Tentative Course Schedule:**

Week 1: January 18-22	Introduction, Resumes and Applying for a Job The Software Lifecycle, Collaboration and The Mythical Man-Month (Read Chapter 1 of Software Engineering, Chapter 2 of Programming Interviews, and "The Mythical Man Month")
Week 2: January 25-29	Cover Letters, Big-O review, Searching and Sorting Documents and Project Management (Read Chapters 2 and 3 of Software Engineering and Chapter 3 of Programming Interviews)
<b>January 26</b>	<b>Last day of Add/Drop (by 5pm)</b>

Week 3: February 1-5	Interviews, Linked Lists, Trees and Graphs Requirements Gathering and Analysis (Read Chapter 4 of Software Engineering and Chapters 4 and 5 of Programming Interviews)
Week 4: February 8-12	High-Level Design, Arrays and Strings (Read Chapter 5 of Software Engineering and Chapter 6 of Programming Interviews)
<b>Week 5: February 15-19</b>	<b>Recursion, Low-Level Design</b> <b>(Read Chapter 6 of Software Engineering and Chapter 7 of Programming Interviews)</b>
<b>Week 6: February 22-26</b>	<b>Parallelism, Semaphores, and Concurrency Software Development</b> <b>(Read Chapter 7 of Software Engineering and Chapter 8 of Programming Interviews)</b>
Week 7: February 29-March 4	Object-Oriented Programming, Testing (Read Chapter 8 of Software Engineering and Chapter 9 of Programming Interviews)
<b>March 7-11</b>	<b>SPRING BREAK : NO CLASS</b>
Week 8: March 14-18	<b>Databases, Deployment</b> <b>(Read Chapter 9 of Software Engineering and Chapter 10 of Programming Interviews)</b> <b>Deadline to Withdraw (by 5pm)</b>
<b>March 14</b>	
Week 9: March 21-25	Networking, Metrics (Read Chapter 10 of Software Engineering)
Week 10: March 28-April 1	Binary Arithmetic and Computer Organization, Software Maintenance (Read Chapter 11 of Software Engineering and Chapter 11 of Programming Interviews)
Week 11: April 4-8	Computer Graphics, Process Models (Waterfall, Iterative, Agile) (Read Chapters 12 and 13 of Software Engineering)
Week 12: April 11-15	Discrete Math, Brain Teasers, Extreme Programming (Read Chapter 14 of Software Engineering and Chapter 12 of Programming Interviews)
Week 13: April 18-22	Geometry, Project Work Week (Read Chapters 13-15 of Programming Interviews)
Week 14: April 25-29	MFT Practice, Project Work Week
<b>Final Exam: May 2 (Monday)</b>	<b>MFT Exam (11:30am - 2:00pm) [Tentative]</b>