CMSC 161: Software Development Tools and Principles (Fall 2024)
http://marmorstein.org/~robert/Fall2024/161.html

Lecture (Rotunda 356): 2:00pm – 2:50pm WF
Instructor: Dr. Robert Marmorstein, 395-2185, marmorsteinrm@longwood.edu
Office Hours (Stevens 109): M 2:00pm – 3:50pm, TWRF 1:00pm – 1:50pm

I am also available by appointment. To schedule a visit, contact me at least 24 hours in advance.

Course Description: This class is a laboratory-driven class which prepares students for advanced work in computer science by developing facility with the non-programming tools and practices that support software development. Students will learn to collaborate using agile programming practices, use a text editor to create internal and external documentation, navigate the Linux command line environment to run programs and manipulate files. 1 credit.

Co-requisite: CMSC 160 or CMSC 162.

Textbook: There will be no textbook for this course. Instead, I will expect you to read a series of online resources (such as tutorials) and other handouts that I will provide on the course web site.

Course Student Learning Outcomes: By the end of the course, the successful student will be able to
- Run simple Linux commands and construct command pipelines
- Use software tools and agile programming practices to collaborate with others
- Create and edit program code and documentation using a text editor
- Use software tools and file redirection to test a program
- Create development and production environments using virtual machines and/or containers

Course Structure and Student Expectations: This is a laboratory-driven class which will meet two times a week for fifty minutes (twenty five total hours). There will be a brief lecture to introduce each tool, followed by a laboratory session. You should take careful notes of the lecture and any class discussions or question periods that follow.

You will also need to spend time outside of class completing the projects, reading tutorials and other resources, and preparing for tests and quizzes. The amount of time this requires will vary from week to week, but you should expect this to take around an hour per week (about 12.5 to 14 hours total over the course of the semester).

Course Requirements: Your grade will depend on your successful completion of projects, a final exam, participation, homework assignments, and quizzes.

Major Assignments:

Note: *Due dates for the major assignments of the class can be found at the end of this syllabus on the tentative course schedule.*

Projects: There will be one project every week or two. Some of them will be individual projects designed to teach you specific skills. Others will be group projects designed to help you learn to collaborate with others. See the tentative schedule below for projected due dates.

Homework Assignments and Quizzes: I give unannounced pop quizzes in class. You should prepare for these quizzes by making sure you have done the assigned reading for each class before coming to lecture. Homework assignments will be submitted as hard copies to my office (Stevens 109). If I am not in, you may slip them under the door.

I do not use Canvas for this course. Electronic submission will be through the submit system at https://marmorstein.org/~robert/submit/

Electronic copies of handouts, which you may print if you lose your hard-copy handout, and links to other readings and resources will be made available on the course web site (http://marmorstein.org/~robert).

Final Exam: The final exam will take place on **Friday, December 13th** at **8am**. I will hand out the exam in **Rotunda 356** and it will be due to my office by the end of the exam period. It will be a comprehensive final covering all topics of the course. A study guide will be provided and collected before the exam, but the exam will be closed book and closed notes.

Grading Policy: In general, I do not accept late work and assign it a grade of 0% (even if it is only a few minutes late). However, in some circumstances, such as a medical condition or serious emergency which prevents you from completing the assignment on time, I may be willing to grant an extension. If this arises, you do not need a doctor's note, but you MUST contact me by e-mail within a reasonable period of time (typically 12-16 hours) to explain the reason for the late work so that I can decide whether it merits an exception to the policy.

Grading Scale: A: 91-100, A-: 90, B+: 89, B: 81-88, B-: 80, C+: 79, C: 71-78, C-: 70, D+: 69, D: 64-68, F: 63 and below (note that there is no grade of D- in this course).

Grade Weights: Your grade will depend on your successful completion of laboratory projects (60% of your grade), a final exam (20%), participation (5%), and homework assignments and quizzes (15%).

Attendance Policy: I expect you to attend class unless you are sick or engaged in a school-sponsored extra curricular event (such as a research conference, programming competition, or athletic tournament). I will primarily rely on your honor to enforce the attendance policy, but I do adhere to Longwood's 10% and 25% rules. In accordance with that policy, missing more than 10% of scheduled class time to unexcused absences may, at my option, result in loss of one letter grade. Missing more than 25% of class (whether to excused or unexcused absences) may result in a failing grade.

If you must miss class due to illness or an approved event, you should contact me on Slack or by e-mail **before** the absence (or, if that is not possible, within 12 hours of the absence) to explain why you were absent and to work out a schedule for any missed work (such as pop quizzes).

Disability Accommodations Policy: If you have an approved accommodation for a disability through the Accessibility Resources Office (ARO), you should arrange to meet with me during the first week of class to discuss how we can address your accommodation without drawing attention to you or disrupting the course.   If you have an accommodation to take your exams in an alternative location (such as the distraction reduced environment), you must make arrangements with me at least 24 hours before each exam so that I can provide a copy of the exam to ARO. In general, I do not extend accommodations to students who have not been officially approved by ARO. However, if you have a medical condition (such as a broken leg), I may be willing to extend temporary accommodations while you negotiate with ARO.

Collaboration and the Honor Code: All work in this class should be considered to be pledged work. I take the honor code very seriously and will report suspected honor code violations to the honor board – even for a first offense. Any violation of the honor code in this class will result in a grade of **F** for the course in addition to any penalties imposed by the honor board.

However, I do not view the honor code as a punitive tool. It is also a guardian that enables healthy collaboration and research – as long as you know and follow the rules. To that end, here are some principles you should follow in this class:

1. You **MAY** collaborate on homework problems as long as you:

   a. *write down (or type) your own answers in your own words* and
   b. *give credit to those with whom you have collaborated.*

   To give credit, simply write the names of others you have worked with in the margin of your handout.

2. You **MAY NOT** collaborate in ANY way on tests and quizzes.

   Tests and quizzes must be completed entirely on your own. All tests and quizzes will be taken closed-book and closed-notes and you should not discuss them with anyone but me.

3. You **MUST** give proper credit to sources you use in your work (both on your paper and other course assignments).

In this class, you must cite **any** sources you use, including articles, tutorials, interviews, books, web pages, graphics, videos, songs, charts, and other forms of print or electronic media.

4. You **MAY** ask me for help during office hours.

Information I provide to you during office hours or lecture does not need to be cited unless it comes from an external source (for example, if I point you to an article on the web, you do not need to cite me, but SHOULD cite the web site).

Plagiarism is a form of cheating that involves taking credit for someone else's work. Students often don't realize that citing a source by adding it to a bibliography page is not enough – you must also clearly indicate WHERE in your paper or project you used the borrowed material. The easiest way to do this is by adding either a footnote or endnote, but can also use "in-text" citations.

The Longwood library has some good materials about how to avoid plagiarism at this link: https://libguides.longwood.edu/c.php?g=1144855&p=8355762.

Generative AI systems such as ChatGPT and Google Bard by their inherent nature produce results that use intellectual work scraped off the Internet without proper attribution. As such, use of these systems implicitly commits plagiarism. You **MAY NOT** use these systems in any way on work you turn in for this class. You **MAY** use these to generate examples for your own exploration and learning as long as you are careful to keep that work separate from anything you turn in.

Food and Drink: Please do not eat in class (it distracts me and the other students). You MAY bring non-alcoholic beverages to class. Violations of this policy will be considered an unexcused absence and count toward the 10% and 25% rules. I occasionally make exceptions to this rule for students who would otherwise miss lunch or have a related medical condition. If you feel that you need such an exception, you MUST make arrangements with me before you bring food to class.

Cell Phones and Laptops: Cell phones and laptops must be turned off and put away during lecture, unless specifically requested by the instructor. Violations of this policy will be considered an unexcused absence and may also incur a grade penalty.

Communications Policy: The best way to get in touch with me is to use **Slack**. Slack is a chat utility with clients for mobile devices and desktop computers. I recommend you install it on both types of devices. Slack will allow you to easily send me code snippets, ask questions in

real time, or set up a Zoom meeting if we need to video chat. You should sign up for a Slack account by visiting https://longwood-cmsc.slack.com. Use your @live.longwood.edu email address to register and you will be automatically approved for an account.

I will expect you to check the **#cmsc-161** channel every day before class in case I have posted an announcement or asked you to bring something to class.

When you send me a Slack message, I instantly get a notification on my computer, tablet, and phone. Typically, I will reply to Slack messages within 24 hours (often sooner) on weekdays. While I am often available in the evening or on weekends, you may need to be patient if I am busy with other students or family obligations.

If you are **asking for help with a project or homework problem**, you should attach your work to a direct message in Slack so that I can see where you are at. You should do this by using the "plus" icon to attach the file directly to your message or by copy/pasting the particular snippet of code you are working on to the body of the message.

Please do NOT attach pictures of your work taken on your phone. These are often blurry and always hard to read. Also, if you attach your code I can run it to see why it is failing, but if you only send me a picture of it, I will have to "guess" why it is wrong. Nevertheless, it is sometimes useful to be able to see a picture of your screen. The best way to do this is to take a screenshot of your system using the "Spectacle" program (usually by pressing the Print Screen "PrtSc" key).

One last suggestion: **don't "ask to ask"**. Asking me whether you can ask a question wastes my time and yours. I am delighted to answer questions about the projects and homework assignments and you should feel free to ask questions at any time (yes, even 3am the night before the project is due – I MIGHT be awake and online – and I'm happy to help you find an answer).

Slack is also a good way to communicate with other members of the class. You will be invited to a public **#cmsc-161** channel in which you can discuss the projects and other course topics with other students in the class. Feel free to ask for help on this channel, but please stick to general questions rather than posting code.

You can also reach out to me by e-mail to marmorsteinrm@longwood.edu. However, please do not send me large files by e-mail. They take up space toward my limited quota on the mail server and cause me all sorts of headaches. **E-mail messages containing large files will be deleted unread**.

I am much slower at replying to e-mail (since I do not get a notification and have to log in to check it). Typically, you can expect a reply to an e-mail within 48 hours, but this may be longer on weekends, and I may not receive your message at all or may not be able to respond to it (my inbox is often over the "quota" allowed by campus I. T. and this often prevents me from using the system effectively).

Additional Policies: Information about additional resources, such as the campus intellectual property statement, accessibility resources, mental health resources, and information on how to report crimes and sexual misconduct can be found at:

  http://www.longwood.edu/academicaffairs/syllabus-statements/

Tentative Course Schedule:

Week 1: Aug. 28 – Aug. 30   Introduction, Using Slack to Communicate
Networking: Remote Login and Secure Shell
Networking: File Transfer (sftp, wget and curl)

Linux CLI: Reading and Searching Man Pages
Vim: Opening and Closing Vim

Project 0 (Accessing a Linux System) Due: Sept. 4

Sept. 2   **Labor Day Holiday**

Sept. 3   **Last Day of Add / Drop**

Week 2: Sept. 4 – Sept. 6   Linux CLI: Basic Shell Commands
Linux CLI: Tab Completion and History
Linux CLI: Managing Files and Folders

Vim: Understanding Modes
Vim: Navigation and Searching

Week 3: Sept. 11 – Sept. 13   Linux CLI: The .bashrc file
Linux CLI: Environment Variables and the Shell Prompt
Linux CLI: Managing File Archives with "tar"

Vim: Swap Files
Vim: Yank, Delete, and Put

Project 1 (Shell Basics) Due: Sept. 13

Sept. 12   **Convocation**

Week 4: Sept. 18 – Sept. 20 Agile Principles: Internal and External Documentation
Agile Principles: Coding Style and Formatting Tools
Documentation: Markdown, YAML, and HTML

Vim: Code Formatting

Week 5: Sept. 25 – Sept. 27 Networking: Addresses and Domain Names
Linux CLI: File Permissions and Ownership

Vim: Visual Mode
Project 2 (Vim Fundamentals) Due: Sept. 27

Sept. 26   **Symposium on the Common Good**

Week 6: Oct. 2 – Oct. 4   Virtual Machines and Docker Containers
Basics of Web Design

Vim: Change, Substitution, and Replace commands

Week 7: Oct. 9   Compilation tools and compiler options
Linux CLI: Jobs, Processes, and Signals

Vim: Buffers and Windows

Project 3 (Using Containers) Due: Oct. 9

Oct. 10 – Oct. 11	**No class: Fall Break**
Week 8: Oct. 16 – Oct. 18	Agile Development: Scrum and Kanban Agile Development: Using git to track changes Vim: Undo/Redo
Week 9: Oct. 23 – Oct. 25	Agile Development: Using git to share files Vim: The .vimrc file
Week 10: Oct. 30 – Nov. 1	Project Work Week **Project 4 (Introduction to Git) Due: Nov. 1**
Week 11: Nov. 6 – Nov. 8	Linux CLI: Pipelines and Redirection Agile Development: Principles of Software Testing Vim: Code Completion
Nov. 6	**Deadline to withdraw without an F grade**
Week 12: Nov. 13 – Nov. 15	Regular Expressions and Globbing Linux CLI: Using grep and sed
Nov. 20	**No class: Research Day**
Week 13: Nov. 22	Project Work Week **Project 6 (Testing) Due: Nov. 22**
Nov. 27 – Nov. 29	**No class: Thanksgiving**
Week 14: Dec. 4 – Dec. 6	Final Exam Review
Dec. 13	**FINAL EXAM (Friday, 8am)**