

Syllabus

CMSC 161: Software development tools and principles

Spring 2026

Lab: MW noon, Rotunda 356
Websites: <https://cs.longwood.edu/courses/cmsc161>
<https://longwood.instructure.com/courses/1323716>

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. Corequisite: CMSC 160 or 162. 1 credit.

Professor: Don Blaheta
Office: Rotunda 334
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Email: blaheta@longwood.edu
100% office hours: Mondays 3–4pm; Tuesdays 1–2pm;
Wednesdays 10–11am; Thursdays 11am–noon

Overview

As you learn to do computer science, whether that's developing software, administering systems, managing networks or databases, or some other aspect of the field, there are a number of basic skills that you need to support those goals. In your other CMSC course (CMSC 160 or another) your focus will be on learning the algorithm and programming techniques themselves, this course will build the skills to make the other coursework easier (or in some cases even possible).

Course learning outcomes

At the end of this course, the successful student will be able to:

1. Run simple Linux commands and construct command pipelines
2. Use software tools and agile programming practices to collaborate with others
3. Create and edit program code and documentation using the vim text editor
4. Create development and production environments using virtual machines and/or containers

Textbook and resources

There is no textbook for this course. Instead, you will be assigned readings from (free) online resources.

You will be given an account on the department's computer systems, where we'll use the Linux operating system and a compile system built on the `gcc` compiler. You may also be interested in installing Linux on your own machine; if so, contact me and I'll help you get it set up.

You must have a device capable of running ssh software that you can bring to class—this probably means a laptop, although some kinds of netbooks might work. You'll need to bring the device with you (charged enough for 50 minutes and/or bringing a power cord) every day, including for exams.

I'll ask you to join the Slack channel for this course. Slack is a communication system similar to IRC or Discord, widely used in the professional tech community to manage team communications, and seems like a better way to ask and answer questions than a Canvas discussion board. You'll get an invite in your Longwood email, but if you prefer to connect from another email address that's fine too (just tell me so I can send the invite).

In the hopefully unlikely event that you need to go into quarantine or isolation (for Covid-19 or for some other reason), but are otherwise well enough to continue working, I'll expect that you have a device (your computer, or a phone or tablet) that is capable of connecting to a live meeting via Zoom, and reasonable bandwidth to accommodate that. (See also the "Covid-19 notes" section at the end of this document.)

AI Policy

My general feeling about AI is this: AI is a tool. Use it when it's helpful, don't use it when you could do it better or faster yourself.

That said, there are certain skills that programmers and computer scientists will need to develop and execute without the help of AI, slightly because AI might not *always* be available but mostly because you'll need to be able to evaluate and debug the code that the AI (or other programmers) have given you. Thus for assignments that are about *developing* your programming skills (labs, homeworks, projects), I'm going to discourage use of AI until you've given a few solid attempts without. For assignments that are *assessing* your skills (exams) I'll have specific instructions on whether you are or are not allowed to use generative AI to assist. *In general* tasks that you're doing on your own time will permit use of AI, but please attend to specific instructions on each assignment.

I will expect that when you *do* use generative AI, you will document it: say which AI system you used and what help it gave you. **In a comment or embedded link, you should include the “share” URL that lets others view your prompts along with the AI’s responses.** Some assignments will have additional instructions how to document this.

(Note that although Longwood’s Honor Code does not inherently ban the use of AI, some other professors seem to think it does, so for your safety you should check with each professor before using it in their class.)

Content

Graded work

I figure that I have on average about 3 hours of your time every week, including class (lab) time; this course is unusual in that most of the work is in the classroom, but I'll still expect an hour or so per week of outside-class preparation as well. If you find you're regularly spending substantially more time than this, please do come discuss it with me, so that we can ensure you're making the most effective use of your time. The work you do for this course will be evaluated as follows:

Lab work and engagement. This is a lab class, so you have to be ac-

tively engaged in the work of the class every day. These points are generally available if you are present and working on the day's lab and not faffing around; if you miss class for a reasonable reason and show me next time that you went back and worked on the lab, that's fine too. If you finish the main part of the lab early, I'll expect you to practice its techniques on other work you have to do (e.g. for CMSC 160) for the remainder of the period, and/or help your classmates to work on it.

This makes up 20% of the course grade.

Mastery practicals. Some of the skills taught in this class are things that, to be useful, you need to be able to do without a lot of thinking or poking through documentation, at least if you want to get anything else done. For these there will be in-class *mastery* tests: the grade on a test will be all-or-nothing, but you'll be able to retake it until you pass it. There will generally be a time limit, although see below about accommodations. These will make up 30% of the final grade.

Exams. There will be two exams, one in March and one during the finals period. The final will not be explicitly cumulative, though of course the material from the second half of the course builds on the earlier stuff. **You are not permitted to discuss the exams *at all*, with anyone other than me.** Each exam is worth 25% of the grade.

The final exam will be 11:30am–2pm on Tuesday, 5 May. If you will need to adjust that date you need to talk to me *well in advance* to arrange it.

What's the deal with CMSC 160?

In order to register for this course, you needed to also enroll in CMSC 160 (or perhaps CMSC 162). (If you somehow got in without doing so, please see me ASAP!) In that course you will be learning about how to design programs; in this course we'll make use of some of those programs as a platform to teach you development tools. While you won't be graded on the quality of the programs per se in this course, I'll assume some basic programming abilities as the semester goes on. (Meanwhile, CMSC 160 will increasingly assume that you understand the skills taught in this course as well!)

Grading scale

I tend to grade hard on individual assignments, but compensate for this in the final grades. The grading scale will be approximately as follows:

A-	[85, 90)	A	[90, 95)	A+	[95, 100]
B-	[70, 75)	B	[75, 80)	B+	[80, 85)
C-	[55, 60)	C	[60, 65)	C+	[65, 70)
D-	[40, 45)	D	[45, 50)	D+	[50, 55)

While there will be no “curve” in the statistical sense, I may slightly adjust the scale at the end of the term if it turns out some of the assignments were too difficult. Final grades of A+ are recorded as an A in the grading system. Final grades below the minimum for D– are recorded as an F.

Note that *individual* grades recorded in Canvas should be accurate (and you should let me know if there’s a data entry error!), but *averages* as computed by Canvas sometimes are not, if the averaging is complex or (especially) if an individual student has a special case scenario. The reference gradebook is my own spreadsheet, and while I will try to make Canvas reflect it (including averages) as well as I can, Canvas can’t always handle it.

Calendar (tentative)

Wk	M	W
January		
1		14
		Intro to 161, using slack
2	[Martin Luther King, Jr. Day no class]	21 Basics of vim; basics of command line interfaces; ssh
3	26 Paths and directories; sftp, wget, curl	28 .vimrc and other dotfiles; environment variables
<hr/> February		
4	2 vim completion; shell tab completion	4 vim ex mode; cut and paste in vim
5	9 diff, shell pipelines and redirection	11 code style and formatting
6	16 files revisited; less, tar	[prof absent no class]
7	23 vim help; man pages; online help sources	25 compiler options, makefiles
<hr/> March		
8	2 documentation: markdown, yaml, html	4 <i>Exam 1</i>

* **22 January:** Deadline to add/drop classes (5pm)

Wk	M	W
	March	
SPRING BREAK		
9	16 vim movement	18 vim search; globbing; grep, regular expressions
10	23 vim windows and buffers	25 file system permissions; addresses and domains
11	30 vim commands revisited	April
12	6 git for version control	1 *
13	13 software testing	8 git for sharing and collaboration; resolving merges
14	20 docker containers	15 software testing, cont'd
15	27 basic web design	29 makefiles revisited
<hr/> May <hr/>		
<i>Exam 2: Tue 5 May, 11:30am-2pm</i>		

* **1 April:** Deadline to withdraw from classes or declare P/F (5pm)

Policies

You can find several university-wide course policies at
<http://www.longwood.edu/academicaffairs/syllabus-statements/> .

Support

This is an introductory course. That means that what is covered is an important basis for other work in the field, *not* that it is supposed to be obvious, or easy. So don't feel bad if something doesn't click right away. Never hesitate to ask me a question; I'll usually at least give you a hint as to where to look next.

You should also make use of your fellow students as resources. While you can't copy each other's work (see the collaboration policy), studying together is a great idea, and asking and answering questions of other students is actively encouraged.

“Office hours”

If I'm in my office and my door is open, that means I'm available for you to drop in and ask questions, and I'm happy to turn on my “office hours” zoom link so you can join me that way instead. At least four hours a week I've designated as 100% hours, i.e. there's a nearly 100% chance I'm available at those times.

But I'm in my office a lot and I'd like to effectively communicate to you when you're most likely to catch me, so if you look at my office schedule on my website or linked from Canvas, you'll also see many hours listed with other percentages like 60% or 40 or 10, as informal estimates of the probability I'll have office hours in that block for drop-in questions. (If you want more certainty, you can always give me advance notice and be extra sure I'll be there at whatever time!)

If you can't catch me in my office, email or Slack is probably your best bet.

Accommodations

If you have any special need that I can accommodate, I'm happy to do so; come speak to me early in the term so we can set things up. If you have a documented disability, you should also contact Longwood's Accessibility Resources Office (Brock Hall, x2391) to discuss some of the support the college can offer you. All such conversations are confidential.

Honor code policy

Above all, I ask and expect that you will conduct yourself with honesty and integrity—and not to ignore the other ten points of the Honor Code, either. Take pride in what you are capable of, and have the humility to give credit where it is due.

The two main forms of academic dishonesty are “cheating” and “plagiarism”. “Cheating” is getting help from someplace you shouldn’t, and “plagiarism” is presenting someone else’s idea as if it’s your own. If you ever find yourself inclined towards either of these, know that there are always other, better options. Persevere! See my website¹ for some discussion and examples of how to steer clear of these problems, and feel free to come talk to me if you need help finding some of those other options (even if it’s for another course).

Cheating or plagiarism (on any assignment) will normally receive a *minimum* penalty of lowering the *course* grade by a full letter, and may range at my discretion up to an F *in the course*. Cases will also be turned in to the Honor Board. But: I believe in your potential, and I hope that you will, or will grow to, observe this policy not simply to evade punishment but positively as a matter of character.

Attendance and late policy

Attendance is required, and assignments must be turned in on time. That said, if you have a good reason to miss class or hand something in late, I tend to be fairly liberal with extensions if you ask in advance. (Good reasons do include assignments due for other classes.) (And medical and

¹<http://cs.longwood.edu/~dblaheta/collab.html>

family emergencies are exempted from the “in advance” part, of course. But contact me ASAP.)

Frequent absence will result in a lowered participation grade; habitual absence may in extreme cases result in a failing grade for the class. *Unexcused* late assignments will normally be given a zero.

Inclement weather policy

I don’t plan to cancel class for weather unless the entire college shuts down; and if the campus closes, I’m likely to hold class in some form by zoom instead (check your email). If you are commuting or are otherwise significantly affected by a weather event, use your own best judgement (and remember that zoom is an option); and if you do miss class for this reason (e.g.: power’s out too), contact me as soon as possible to make up missed work.

Early bird policy

Nobody’s perfect, and on occasion an assignment gets written a little unclearly (or, once in a while, with an actual error in it). If you catch one and bring it to my attention early, so that I can issue a clarification or correction to the rest of the class, there’ll be some extra credit in it for you.

The section formerly known as “Covid-19 notes”

I have a few policies that originally evolved in response to the pandemic but I’ve decided they’re just good policy so I kept them. Here’s the gist: It’s really easy to keep zoom open for every class, and it’s not nearly as good as in-person attendance but way better than total absence. So I open Zoom every day and ask you to make good choices.

Attending class. There are two ways you can attend class: in person, or via Zoom link. Either mode of attendance is sufficient to mark you as “attending” (not necessarily engaging or participating). If you attend via Zoom link,

- you must have a reason, and

- you must say what it is,

but I don't need any medical detail and if it's not directly covid-related I'm not going to police that. (Again: be an adult and make good choices.) The Zoom experience is nowhere near equivalent to the in-person experience and is not a replacement for it; but if you are quarantined, or otherwise just can't attend in person on a particular day, zooming is better than total absence.

Zooming vs masking. Although we've moved from "pandemic" to "endemic" on Covid-19, I'd just like to remind everyone that masking is still a tool in our toolkit: if you're feeling a bit sniffly, you can still wear a mask. We all have masks, we all got really good at wearing them, and it's a courtesy to your classmates to take this easy step to decrease the likelihood of spreading anything. (Including colds and other stuff! Masks help us not spread *lots* of things.)

What if the professor gets sick? Same as for students: if I'm feeling a little sniffly, I'll wear a mask, and if I am more seriously sick (but well enough to teach), I'll zoom myself into the class. If necessary I can teach from a zoom window on the projector screen (and have done so!); I'll post to the Slack and send an email with instructions as soon as I know I need to do this.

This document was written and prepared without the use of generative AI.