



# CS 262: Introduction to Low-Level Programming

## Course Syllabus - Fall 2023

### 3 credits

George Mason University  
Department of Computer Science

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## Course Basics

**Sections:** 001, 002, 006

**Instructor:** Ana Loreto González Hernández  
**Email:** [loreto@gmu.edu](mailto:loreto@gmu.edu)  
**Office Hours:** T 4:00 pm – 5:30 pm  
**Office:** BUCHAN D217D

**Sections:** 004, 005

**Instructor:** Hamza Mughal  
**Email:** [hmughal2@gmu.edu](mailto:hmughal2@gmu.edu)  
**Office Hours:** M/W 3:00 pm – 4:00 pm  
**Office:** BUCHAN D217F

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### Lectures:

Section	Days	Time	Building	Room
001	T,Th	12:00 pm – 01:15 pm	Innovation Hall	132
002	T,Th	01:30 pm – 02:45 pm	Innovation Hall	105
004	M,W	09:00 am – 10:15 am	Planetary Hall	131
005	M,W	04:30 pm – 05:45 pm	Lecture Hall	1
006	M,W	12:00 pm – 01:15 pm	Innovation Hall	132

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### Textbook (Required)

- Kernighan and Ritchie, *The C Programming Language*, 2nd ed., Prentice Hall, 1988

### Complementary Books:

- Byron S. Gottfried, *Programming with C*, 2nd ed., Schumm's Outline, 1996 or the latest
  - Printz and Crawford, *C in a Nutshell: A Desktop Quick Reference*, 1st ed., O'Reilly', 2006
  - Griffiths and Griffiths, *Head First C*, 1st ed., O'Reilly', 2012
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## Course Information

**Prerequisites:** C or better in CS 211 or CS 222, and C or better in CS 110  
\* (CS 110 can be a co-requisite with CS 262)

### Course Description

This course is intended to prepare students for topics in systems programming. It emphasizes relevant concepts of the C programming language, as well as the use of main commands of the Unix Operating System. This is a course on "low-level" programming using C which is taught with an emphasis on operations with pointers.

Most high-level programming languages (and particularly Java) insulate the programmer from the realities of the hardware on which the programs will run. C is the exception since it was originally designed to implement the Unix operating system. C offers the programmer direct access to much of the underlying hardware and, for programs running under Unix, direct access to operating system services. For these reasons C remains the language of choice for systems programming.

## Learning Outcomes

1. Be able to implement, test and debug a designed solution to a problem in a low-level programming language, specifically the C programming language.
2. Demonstrate a good understanding of C language constructs such as pointers, dynamic memory management, and address arithmetic.
3. Demonstrate a good understanding of C libraries for input and output, and the interface between C programs and the UNIX operating system.
4. Demonstrate the ability to use UNIX tools for program development and debugging.

## Course Topics

The course plans to cover the following topics (in no particular order):

- C Types, Operators, and Expressions
- Basic I/O, Input and Output Libraries
- Control Flow
- Functions and Program Structure
- Strings
- Pointers and Arrays
- Dynamic memory allocation
- File I/O
- Structures
- Bitwise operations
- Multiple source files
- The Unix System Interface
- vi/vim
- Debugging using GDB and Valgrind
- Compiling, Linking and Makefiles

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## Evaluation and Grading

Category	Percent	Notes
Lab assignments	20%	1 lowest lab dropped
Projects	30%	
Quizzes	10%	1 lowest quiz dropped
Midterm exam	15%	
Final exam	25%	Cumulative

## Grade Cutoffs

A+ ( $\geq 98$ )	A ( $\geq 92$ )	A- ( $\geq 90$ )
B+ ( $\geq 88$ )	B ( $\geq 82$ )	B- ( $\geq 80$ )
C+ ( $\geq 78$ )	C ( $\geq 72$ )	C- ( $\geq 70$ )
D ( $\geq 60$ )		
F ( $<60$ )		

## Course Work

- **Lab assignments:** Description for lab assignments will be posted on Blackboard. During Lab recitations the lab instructor and one or more UTAs will be available to help students with the assignment. Submissions must be through Blackboard by the due date.
- **Projects:** There will be 3 projects in the semester. Project descriptions will be posted on Blackboard and student's solutions must be submitted on Blackboard by the assigned due date. If your program is incomplete, you may still submit for partial credit. However, your code must run without obvious errors (even if all functionality is not present). Notice your GTA relies on running your program as part of your grade determination.
  - The cutoff for on-time submission is 11:59 pm on the due date.
  - Note email submissions are not accepted.

Students are responsible for verifying that all submissions are the correct file and that the submitted files can be extracted correctly. Please note that once a submission link expires, we do not accept resubmissions due to corrupted files or incorrect file submissions.

## Late Work

Late projects and labs are penalized 10% per day (incl. weekend days/holidays). For instance, if a lab assignment score is 10 points and the submission is one day after due, -1 point will be deducted, and if the submission is two days after due, -2 points are deducted.

If your program isn't the way you'd like it to be when the deadline is near, submit it anyway for partial credit. The system permits you to retrieve and resubmit your assignment until the due date, so you may resubmit if you improve your program prior to the deadline. The last submission is the one graded by your GTA.

- The latest you can turn in work is 48 hours after the posted deadline, after this time the submission link will be not available anymore.

Each student gets **TWO Emergency-Day tokens** that are automatically used by submissions that are between 0-24 and 24-48 hours late to avoid points penalty. These days are applicable for Projects assignments. An unused token is 0.5% extra credit at the end of the semester.



It is highly recommended to attend your lab sessions, as they are intended to clarify the necessary aspects for lab and project assignments. During labs GTAs and UTAs will provide assistance and give hints to develop your programs ☺

**Quizzes** must be taken on the scheduled date/time.

- For lectures 004, 005: quizzes are in person.
- For lectures 001, 002, 006: quizzes are online. Their availability is from 10:00 am – 10:00 pm during the posted day.

**Exams** must be taken on the scheduled date/time.

If you know in advance that you are unable to take an exam on the scheduled date for a valid and unavoidable reason, you must notify your professor at least one week before the scheduled exam date to make arrangements.

**Replacement Midterm policy:** If you perform better on the final exam than on your midterm, the midterm grade is replaced with the final exam grade.

**Per departmental policy, you must pass a significant exam threshold to receive a passing grade in this class regardless of your performance on other assignments. To receive a passing grade in this course, your final exam grade **MUST** be  $\geq 60\%$  or the average exam grade **MUST** be  $\geq 65\%$**

If you feel points have been incorrectly deducted, contact the grader. For all projects and lab assignments, that is your GTA. For exams, that is your professor. Contesting of grades on any/all submissions must be requested within one week of receiving the grade. No grade changes will be considered after that deadline.

There is no compensation for a missed assignment. Only if the circumstances that caused you to miss an assignment are justifiable (e.g., surgery), contact the professor no later than 3 natural days after the due date and attach supporting documentation, otherwise your case will be dismissed.

## Class Communications

CS 262 will be using Piazza and Blackboard for most class communications. You are responsible for any notifications or information posted on Blackboard/Piazza either by your instructor, your GTA or the class UTA(s), and you will need to check the systems regularly for such notices. Some information may be disseminated through these systems rather than in class. Individual communications with the instructor/GTA/UTA may be done by via Piazza.

## Privacy and FERPA

Students must use their Mason email account to receive important University information, including communications related to this class. The instructor and GTAs cannot respond to messages sent from or send messages to a non-Mason email address. We will not list your Mason email address on any public forum or provide it to any other students. Your Mason email address will be provided to grading staff (GTA and graders). If this is an issue, please contact the instructor so that we can figure out another option. Video recordings of class meetings that are shared only with the instructors and students officially enrolled in a class do not violate FERPA or any other privacy expectation. All course materials posted to Blackboard, or any other course site are private; by federal law, any materials that identify specific students (via their name, voice, or image) must not be shared with anyone not enrolled in this class.

For email communication, use your Mason email, including the subject and your section. Please note that emails sent on weekends may not be answered at that time and will be reviewed until Monday and answered in the order they are received.

## Special Accommodations

If you are a student with a disability, please see your instructor and contact the Office of Disability Services (ODS) at (703) 993-2474. All academic accommodations must be arranged through the ODS: <http://ods.gmu.edu/>

## Inclusion

Every student in this class, regardless of background, sex, gender, race, ethnicity, class, political affiliation, physical or mental ability, veteran status, nationality, or any other identity category, is an equal member of our class. If you encounter any barriers to your inclusion, please feel free to contact your professor.

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## 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 Departments 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? When you are responsible for a task, you will perform that task. **All class-related assignments are considered individual efforts** unless explicitly expressed otherwise (in writing).

Cheating on any assignment will be prosecuted and result in a notification of the Honor Committee as outlined in the GMU Honor Code. Sharing, collaboration, or looking at any code related to programming assignments that is not your own is considered cheating. Any attempts at copying or sharing code, algorithms, or other violations of the honor code simply will not be tolerated. We use automated software to flag suspicious cases, and then review them to find the cases that must be submitted to the Office of Academic Integrity **with recommendation to fail the course (F)** plus further measures.

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.

## Programming Policies

- (1) **No sharing or discussion of code for assignments.** Unless specifically stated otherwise, all assignments are individual assignments, not group assignments. Students are expected to do their own work, not to share programs with each other, nor copy programs from anyone else. However, you may offer limited assistance to your fellow students regarding questions or misunderstandings on their programming assignments. Suspected honor code violations are taken very seriously, and will be reported to the Honor Committee. (See [CS Honor Code](#))
- (2) **No incorporation of code from any source external to the course.** You may not incorporate code written by others. Of course, you may freely use any code provided as part of the project specifications, and you need not credit the source. Working something out together with an instructor or GTA will not require crediting the source.
- (3) **Back up your program regularly.** You are expected to back up your program in separate files as you get different pieces working. Failure to do this may result in your getting a much lower grade on a program if last minute problems occur. (Accidentally deleting your program, having problems connecting, etc., will not be accepted as excuses.)

- (4) **Keep an untouched copy of your final code submission.** It is important that you don't touch your programs once you have made your final submission. If there are any submission problems, consideration for credit will only be given if it can be verified that the programs were not changed after being submitted.
- (5) **Code must run on Mason gcc.** Students may develop programs using any computer system they have available. However, submitted programs must run under gcc compiler available on Mason. Your documentation should clearly state which software was used for compilation, and once makefiles are introduced, a makefile should be included with each assignment submission.

## Extra Information (sections 004, 005)

### Electronic Devices

Please feel free to use laptops, tablets, etc. to take notes, review slides, etc. during class. If you know that you will need to be doing other things on your screen/device (answering emails, perusing tiktok, etc.), please sit in the back row to ensure that other students are not distracted by your screen. We all need to do this stuff some times, and I have no judgements on you if you choose to sit in back with your screen open - just do not distract those sitting around you.

### In Class Activities

Most lectures will feature interactive activities and/or quizzes. These quizzes and activities are meant primarily to help me understand how well you (and the class as a whole) are understanding the material.

You are strongly encouraged to bring your laptop or phone to class so that you can participate in the activities.