PURDUE UNIVERSITY

CS 240: Programming in C

Spring 2025

Class:
LE1: Monday/Wednesday 10:30am, CL50 224
LE2: Monday/Wednesday 11:30am, CL50 224

Course Web Page:
https://mandalore.cs.purdue.edu/~cs240/

Course Newsgroup:
https://edstem.org/us/join/nRphkc

Instructor:
Dr. Jeff Turkstra, DSAI 1139E, jeff@cs.purdue.edu, 49-63088.

Teaching Assistants:
This course has twenty-two graduate teaching assistants as well as a number of undergraduate teaching assistants. The names and email addresses for the GTAs and Head TA are given below.

Head TA:	
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Text:
Required
The C Programming Language (2nd ed); Kernighan and Ritchie; Prentice Hall, March 1988
ISBN-13: 978-0131103627
Recommended
Beej's Guide to C Programming; Brian "Beej" Hall; 2007
https://beej.us/guide/bgc/

Prerequisites:
Problem Solving and Object-Oriented Programming – CS 18000
Programming proficiency is required

Course Outcomes:
A student who successfully fulfills the course requirements will have the ability to:

1. write quality code that is readable, maintainable, and well commented
2. create, compile, and execute C programs using industry standard tools including the GNU Compiler Collection
3. apply debugging techniques to analyze, identify, and fix errors
4. assess and address security-related issues in code bases written in C
5. produce code that appropriately and properly utilizes pointers
6. solve problems through the application of explicit memory management
7. design and implement programs in C that utilize dynamic data structures such as linked lists and trees

Lecture:
Lecture attendance is expected and required. Quizzes will be given for randomly selected lecture sessions. If you must miss a lecture, you are responsible for procuring any material, information, handouts, announcements, etc., that you missed.

Preparation for Lectures:
You should try to read over the relevant pages in the course text before lecture. Additionally, you are expected to check your email, the course website, and the course newsgroup regularly. Due to Purdue IT's approach to email, you must also monitor your junk folder and spam reports. Email from the instructor is often flagged as spam. Here is the *tentative* lecture schedule:

Wk	Lec	Subject
1	1	Course Introduction
	2	Compiling, Object Files, Linking, and Execution
2	X	No Lecture (MLK Day)
	3	File I/O
3	4	More File I/O
	5	assert(), Random-access File I/O, typedef, and Structures
4	6	More Structures, Declaration vs. Definition, String Functions
	7	Arrays, Memory Layout of Data
5	8	Memory Layout of Data, Padding, and Binary File I/O
	9	Bitfields, Unions, Enums, and Bitwise Operations
6	10	Introduction to Pointers
	11	More Pointers, Debugging Introduction, Address-of Structures, . and -> Operators
7	12	malloc() and free(), Midterm 1 Review
	X	No Lecture (Exam Makeup)
8	13	Linked Lists
	14	Doubly-Linked Lists, Pointers to Pointers
9	15	Pointers to Pointers, The Many Faces of Zero, Pointers to Functions
	16	Pointers to Functions, Recursion
10	X	Spring Break
	X	Spring Break
11	17	Trees
	18	Types, Type Qualifiers, Storage Classes, and The C Preprocessor
12	19	Casts and void, Midterm 2 Review
	20	Callbacks, Efficiency Issues, and Libraries
13	21	Large-scale Development, Random Numbers, Graphical Programming
	22	No Lecture (Exam Makeup)
14	22	Buffer Overflows, System Calls
	23	More Buffer Overflows, System Calls and Assembly
15	24	Core Files and goto, Makefiles, Bubble Sort, and Networking Basics
	25	Networking
16	26	Hardware
	27	Final Exam Review, The End

Lab Sessions:
Lab attendance is only required for the first week. After the first week, lab times are intended to be opportunities to work on the homework and ask questions. Attendance is optional.

Quizzes:
There will be a number of quizzes during and after lecture. After lecture quizzes will be due no later than 24 hours after the end of lecture. Quizzes administered during lecture will be due in lecture. A score of zero will be given in case of no submission. Quizzes will be worth either 10 or 25 points, depending on the question(s).

Homework:
Homework assignments are assigned usually one per week and are due the following week. These are C programs that are submitted electronically. To ensure success, **compile your code on a Linux system, like data.cs.purdue.edu (even remotely), with GCC** and only GCC. For full credit, your code must follow the code standard established for this course (graded as style points). The course webpage has the code standard and examples.

Other important notes on homework:

1. ALL HOMEWORK ASSIGNMENTS ARE DUE AT 9:00 PM on Wednesday of the week it is due (with some occasional exceptions).
2. If you feel you have a valid reason for not having your work done on time, then send one of the TAs an email **BEFORE** the assignment is due.
3. Don't wait until the last minute. If the computer goes down so does your grade.
4. Down time and crashes of the computer network are, in general, NOT valid excuses for late or missed assignments.

Examinations:
Exams will be closed book and closed notes. You must solve the exam problems yourself, without any help (knowing or unknowing) from any other student. You must not seek any knowledge in advance of the test questions (beyond that given in class) and must report any advance knowledge of the test questions by any student that you are aware of. You must not allow any other student access to your solutions during the exam. If the seating situation makes this difficult, please inform the instructor or TAs.

Midterm Exam I: Monday, March 3	8:00pm
Midterm Exam II: Thursday, April 10	8:00pm
Final: TBD	

Regrades:
Problems regarding grading of assignments and the exam must be resolved within **one week** after the graded work has been returned to you. It is your responsibility to pick up the graded work on time. Grades will not be modified after the one week period.

Late Submissions:
A penalty of 5% per quarter hour will be charged to all assignments submitted after 9:00 pm on the day the assignment is due. No assignment will be accepted after 11:59 PM on the due date.

Make-up Examination Policy:
Make-up exams will be given only in the **most extreme** circumstances and require certification for such circumstances. Eg, a medical doctor's statement certifying that the student is **unable** to attend the scheduled exam. Any travel (including interview trips), load from work or from other classes, failed alarm clocks, or simply not being able to make it to the exam will **not** be grounds for a make-up. If you have any recurring medical problems that may unexpectedly prevent you from making it to class or exams, please obtain a doctor's statement certifying your circumstance. Make-up exams must be approved by the instructor.

Extensions:
Because of the extended length of time provided for quizzes and homeworks, extensions are typically only granted in extreme cases and only for university-approved reasons. These include serious illness, family emergency, and official university commitments. In all cases, some form of evidence or documentation must be provided. If the absence is planned (band trips, course field trips, etc.), you must inform your instructor ahead of time. Failure to do so will result in the absence being unexcused. Because of the included 3 day grace period for homework assignments, extensions less than three days will not be approved. Plan ahead.

Academic Integrity:
As a student at Purdue you are subject to the *Purdue University Student Code of Conduct*, which enjoins you to respect the highest standards of honesty and integrity. All work that you submit in this course must be your own; unauthorized group efforts are considered academic dishonesty. See the online brochure *Academic Integrity: A Guide for Students* for definitions and sanctions. Academic dishonesty is a serious offense which may result in suspension or expulsion from the University. In addition to any other action taken, such as suspension or expulsion, a **grade of F** will normally be recorded on the transcripts of students found responsible for acts of academic dishonesty. Students are encouraged to report academic dishonesty to the instructor directly, or to the Office of the Dean of Students.

You may discuss assignments in a general way with other students, but you may not consult anyone else's work. Among other ways to get an F, you are guilty of academic dishonesty if:

- You examine another student's solution to an assignment
- You allow another student to examine your solution to an assignment
- You fail to take reasonable care to prevent another student from examining your solution to an assignment and that student does examine your solution. For example, if you allow another student to check his/her email from your terminal while you step out of the room, you have failed to take reasonable care to prevent him/her from accessing your files.
- You submit an assignment that is not completely your own work
- You share results or notes during quizzes or exams
- You utilize ChatGPT or other software to programmatically generate solutions to any part of an assignment, quiz, or exam

All work is subject to computer-based comparison and analysis. Do not con yourself into thinking that you can hide any collaboration. The risk of getting caught is too high, and the standard penalty is way too high.

If we find reason to believe that a student or team has cheated on any assignment, we may inform the student or team promptly, or we may decide to silently accumulate evidence against the student or team on later assignments.

Grading:
Your course grade will be based on your performance in quizzes, homework assignments, and the exams, weighted in the following manner:

Quizzes and Homework: 50%
Two Midterms: 14% each
Final Exam: 22%

Final grade is then determined by the following maximum cutoffs. Thresholds may be adjusted lower as appropriate, though typically this only occurs with the C cutoff.

Homework/Quiz Average		Test Average		Course Average	Grade
>= 85%	and	>= 85%	and	>= 90%	A
>= 75%	and	>= 75%	and	>= 80%	B
>= 65%	and	>= 65%	and	>= 70%	C
>= 55%	and	>= 55%	and	>= 60%	D
< 55%	or	< 55%	or	<60%	F

Questions and Answers:
Questions of general interest should be posted on the course newsgroup. Answers will be posted as soon as possible. Questions of specific interest should be directed to the appropriate TA via email. Answers will be sent to you directly. If you need to contact a specific TA or instructor, send email to that individual or go see him/her during office hours.

Modifications:
This syllabus may be modified at any time with notification.

**** As an interesting side note, a significant portion of this syllabus is copied from Dr. Rodriguez-Rivera's, Dr. Dunsmore's, Dr. Hosking's, Dr. Brylow's, and Dr. Hu's policy pages from previous semesters. One of the major differences between plagiarism and proper reuse is giving credit where credit is due. ****