

CSC 230 Course Syllabus

CSC 230 – CSC230: C and Software Tools

Section 051 & 651

SUM10 2012

3 Credit Hours

Course Description

Details of C programming as compared with Java; Lexical structure, syntax, semantics, and pragmatics (idioms, common uses) of C; Stages of compilation, linking and execution; Strings, arrays, structures, pointers, and memory management; C libraries; Tools for design, maintenance, and debugging of programs; Separate compilation, modular programming; Integrated development environments.

Learning Outcomes

Upon successful completion of this course, a student will be able to...

1. Write small to medium C programs having several separately-compiled modules.
2. Explain what happens to a program during preprocessing, lexical analysis, parsing, code generation, code optimization, linking, and execution, and identify errors that occur during each phase. In particular, they will be able to describe the differences in this process between C and Java.
3. Correctly identify error messages and warnings from the preprocessor, compiler, and linker, and avoid them.
4. Find and eliminate runtime errors using a combination of logic, language understanding, trace printout, and gdb or a similar command-line debugger.
5. Allocate and deallocate memory in C programs while avoiding memory leaks and dangling pointers. In particular, they will be able to implement dynamic arrays and singly-linked lists using allocated memory.
6. Use the C preprocessor to control tracing of programs, compilation for different systems, and write simple macros.
7. Write, debug, and modify programs using library utilities, including, but not limited to assert, the math library, the string library, random number generation, standard I/O, and file I/O.
8. Use simple command-line tools to design, document, debug, and maintain their programs.
9. Use an automatic packaging tool, such as make or ant, to distribute and maintain software that has multiple compilation units.
10. Use a version control tools, such as cvs or svn (subversion), to track changes and do parallel development of software.
11. Distinguish key elements of the syntax (what's legal), semantics (what does it do), and pragmatics (how is it used) of a programming language.

Course Structure

The course consists of lectures interspersed with exercises. The exercises provide the opportunity to explore recently covered materials individually or with peers. The exercises are submitted so the instructor can get a feel for the class' comprehension of materials in a timely manner.

Homeworks will be completed outside of class. Homeworks consist of larger programming assignments that require students to incorporate several of the topics covered in class. Homeworks will typically be given a week for completion.

Exams test each student's knowledge on specific modules of information. Exam problems are similar in length to the exercises done in class.

Course Policies

Computers and Electronic Devices

Students are encouraged to use computers and other electronic devices like tablets during class. The teaching staff asks that students respect their neighbors and keep their focus on course materials rather than games, FaceBook, etc. Electronic devices are required for submission of exercises.

Food and Drink

Food and drink are NOT allowed in the classroom. This is a policy of the classroom due to the equipment for recording lectures.

Electronic Communication

The teaching staff looks forward to receiving emails and message board posts about any questions you have about the class, materials, exams, and assignments. Below are several rules for electronic communication.

Higher education provides you with a training ground prior to entry into the work environment for your chosen career. You will use many of the following rules of "netiquette" when you are communicating with colleagues, your supervisor, or clients once you are in the work world. Although many of the rules of etiquette for electronic communication will be similar in the work environment, we have some specific to this course.

Please observe the following etiquette when communicating with the teaching staff and your peers. The teaching staff receives many email on a daily basis and the instructor teaches several courses. Please note that a member of the teaching staff will respond to an email or message board within 24 hours on a business day and within 48 hours on a weekend. Most of the time, we will respond more quickly, but it is not guaranteed.

Also, before sending an email, try to find the answer to the question by using various references already available to you:

- If the question is related to class administration, check the syllabus
- If the question is related to recent information, check previous emails from the teaching staff
- If the question is homework or exam related, check the message board to see if it has already been answered. Also, read your textbook.

For emails, please identify your course, section, and your name in the subject line (first and last name) along with the subject of the message. For example: "CSC230 Jenny Smith - Question about Homework 1".

Email should include a salutation to identify the recipients of the email. For example, begin an email to your instructor with a salutation such as "Hi Dr. Heckman," or "Dr. Heckman". For emails to the sup list, consider a salutation like "Greetings Teaching Staff,". You now have the attention of the email recipients.

The tone of the email message should be professional. Re-read your email before you press Send and make a judgment as to how you would respond if you were a recipient of the email you are planning to send.

If you have a question that is beyond the scope of an email, consider coming to office hours or scheduling an appointment with a member of the teaching staff. If you are a DE student requesting a phone conference, send at least two times of the day that you are available and your timezone. To help with scheduling, check Dr. Heckman's calendar:
<http://people.engr.ncsu.edu/sesmith5/calendar.html>.

If you have several questions or items, please number them for ease of reading. The response will also be easier to understand.

Please spell check and correct mechanical/grammar errors. Avoid emails written only in lowercase and lacking punctuation.

Close your email with your name.

If you have a general question about a homework, post your question to the message board. If you have a question that is more specific or that involves snippets of code, email it to the sup list for your section:

- On campus students should email csc230-051-sup@wolfware.ncsu.edu
- DE students should email csc230-651-sup@wolfware.ncsu.edu

Grade Appeals

If at any time you feel an assignment was graded improperly, **write** a request for regrade and explain why you believe the assignment was graded improperly. First discuss the grade with the TA who graded the assignment. If you are still unsatisfied with the answer, submit the assignment to the instructor for a regrade. **All regrade requests must be submitted to the instructor no later than 2 weeks after the assigned was returned to you. Please talk with the TA who graded the assignment FIRST and have the written regrade explanation.**

Minimum Grade Requirements

In order to receive a final grade of C- or higher, you must have an average of 60% or higher on all three exams and an average of 60% or higher on all of the Homeworks. Students failing to meet these requirements will receive at most a maximum grade of D+ in the course.

Instructors

Dr. Sarah Heckman (sesmith5) - *Instructor*

Email: sarah_heckman@ncsu.edu

Web Page: <http://www4.ncsu.edu/~sesmith5>

Phone: 919-515-2042

Office Location: Engineering Building II 2297

Office Hours: Tuesdays and Wednesdays from 1:30p-2:30p

Ryan Kilby (rpkilby) - *Teaching Assistant*

Email: rpkilby@ncsu.edu

Phone: TBD

Office Location: TBD

Office Hours: TBD

Lura Kimbel (lmkimbel) - *Teaching Assistant*

Email: lmkimbel@ncsu.edu

Phone: TBD

Office Location: TBD

Office Hours: TBD

Course Meetings

Lecture

Days: TWH

Time: 12:00noon - 1:15pm

Campus: Centennial

Location: EBII 1230

This meeting is required.

Meeting Notes

DE students are not required to attend the class meetings, but should be watching the lecture videos on approximately the same schedule as on-campus students. The videos for the course will be recording during the on campus meeting times and will posted for DE and on campus students shortly after the lecture is complete.

Course Materials

Textbooks

C Programming: A Modern Approach - K. N. King

Edition: 2nd

ISBN: 0393979504

Web Link: <http://knking.com/books/c2/index.html>

Cost: 94.70

This textbook is required.

Expenses

None.

Materials

None.

Requisites and Restrictions

Prerequisites

CSC216 with a C- or better and CSC or CSU Majors and Minors

Co-requisites

None.

Restrictions

None.

General Education Program (GEP) Information

GEP Category

This course does not fulfill a General Education Program category.

GEP Co-requisites

This course does not fulfill a General Education Program co-requisite.

Transportation

This course will not require students to provide their own transportation. Non-scheduled class time for field trips or out-of-class activities is NOT required for this class.

Safety & Risk Assumptions

None.

Grading

Grade Components

Component	Weight	Details
Homeworks 1-7	40	<p>There are 7 homeworks this semester. All homework deliverables, as specified in the assignment, will be submitted electronically by the due date. See the "Late Work" section of the syllabus for policies about late electronic submissions.</p> <p>If the homework consists of a coded solution, your program must compile and run on the "Common Platform" as outlined on the course website.</p> <p>All deliverables are to be your own work, unless you are allowed to work with a classmate as described in the assignment (and then the deliverables must be your own and your partner's own work). See the "Academic Integrity" section of the syllabus for further details.</p> <p>The lowest (one) homework grade will be dropped.</p>
Exercises	10	<p>In each class, you will be presented with one or more exercise questions based on class material. You are encouraged, but not required, to work on these exercises with another class member. At least one member of the pair/team will need to have a laptop computer, or other electronic device, such as a smartphone, that can submit answers on a Google form or via Moodle. You (and your partner(s)) will be given credit for correct answers.</p> <p>Each exercise will be scored out of 10 points. If you attempt the exercise you will receive at least a 5 (out of 10) on the assignment. The highest exercise score for a lecture will be your exercise grade for that lecture period. The lowest <i>five</i> lecture scores will be dropped, and the remaining scores will be averaged.</p> <p>If you are absent from class, with an excused university absence, you will not be penalized for missing any exercises <i>associated</i> with the class.</p> <p>DE students are expected to complete the exercises as they watch the videos of the lecture. The video should be paused when an exercise is announced. The exercises will be linked in from the Moodle website after the video is posted.</p> <p>A week's worth of exercises will be due on the Sunday after the lectures at 11:45p. For example, all exercises assigned during class on 5/22, 5/23, and 5/24 will be due by 11:45p on 5/27. The solutions to the exercises and the associated code will be posted the next morning (Monday). In our above example,</p>

Component	Weight	Details
		the solutions would be posted on 5/28. Exceptions to this will occur around exams at the discretion of the instructor, where exercise solutions may be posted early for studying.
Exam 1	15	The exam will cover all materials (readings, lecture notes, lecture videos, exercises, and homeworks) for the first third of the course.
Exam 2	15	The exam will cover all materials (readings, lecture notes, lecture videos, exercises, and homeworks) for the first two thirds of the course.
Final Exam	20	The exam will cover all materials (readings, lecture notes, lecture videos, exercises, and homeworks) for the entire course .

Letter Grades

This Course uses Standard NCSU Letter Grading:

97	≤	A+	≤	100
93	≤	A	<	97
90	≤	A-	<	93
87	≤	B+	<	90
83	≤	B	<	87
80	≤	B-	<	83
77	≤	C+	<	80
73	≤	C	<	77
70	≤	C-	<	73
67	≤	D+	<	70
63	≤	D	<	67
60	≤	D-	<	63
0	≤	F	<	60

Requirements for Credit-Only (S/U) Grading

In order to receive a grade of S, students are required to take all exams and quizzes, complete all assignments, and earn a grade of C- or better. Conversion from letter grading to credit only (S/U) grading is subject to university deadlines. Refer to the Registration and Records calendar for deadlines related to grading. For more details refer to <http://policies.ncsu.edu/regulation/reg-02-20-15>.

Requirements for Auditors (AU)

Information about and requirements for auditing a course can be found at <http://policies.ncsu.edu/regulation/reg-02-15-4>.

The grade of "AU" will be awarded to students who earn an average of 60% or higher on the exams and have attempted all exams.

Policies on Incomplete Grades

If an extended deadline is not authorized by the instructor or department, an unfinished incomplete grade will automatically change to an F after either (a) the end of the next regular semester in which the student is enrolled (not including summer sessions), or (b) the end of 12 months if the student is not enrolled, whichever is shorter. Incompletes that change to F will count as an attempted course on transcripts. The burden of fulfilling an incomplete grade is the responsibility of the student. The university policy on incomplete grades is located at <http://policies.ncsu.edu/regulation/reg-02-50-3>.

Late Assignments

All homework assignments are required to be submitted by **11:45p** on the specified due date(s). An additional locker for late homeworks will also be provided that will close 24 hours after the original submission deadline. Work turned into the late locker will automatically lose **20 points**. No work will be accepted after the late work locker closes, unless you have a documented excused absence.

Exercises will not be accepted late.

No late submissions will be accepted through email.

Attendance Policy

Attendance

Attendance to lecture is mandatory!

For complete attendance policies, please see <http://policies.ncsu.edu/regulation/reg-02-20-3>

Absences

Excused absences are defined in the NC State Academic Policy on Attendance Regulations (<http://policies.ncsu.edu/regulation/reg-02-20-03>). Documentation of the absence is required. Exam makeups will only be given with a documented excused absence. All anticipated absences must be presented to the instructor no later than one week before the absence. All emergency absences must be turned in no later than one week after the student's return date. All other absences will be unexcused.

A maximum of 4 class periods per semester may be missed due to excused absences. Any number of excused absences beyond four will only be allowed with special permission of the instructor.

Makeup Work

All homeworks and exams must be made up within one to two weeks of the absence and the timeframe will be determined through discussion between the instructor and student. If a homework assignment has already been returned, the instructor may request the student to complete an alternative assignment. No exercises will be made up.

Additional Excuses Policy

None.

Academic Integrity

Academic Integrity

Students are required to comply with the university policy on academic integrity found in the Code of Student Conduct found at <http://policies.ncsu.edu/policy/pol-11-35-01>

All work that you turn in for grading must be your own! This means that all work must be an independent and individual creation by you. Any attempt to gain an unfair advantage in grading, whether for yourself or another, is a violation of academic integrity. You may only work on an assignment with another student(s) in the class if explicitly stated in the assignment.

Students who cheat on a homework, exercise, or exam will receive a -100 for the assignment!!!

Cheating is worse than not turning in the assignment. All cases of academic misconduct will be reported to the Office of Student Conduct. A first offense will place the student on Academic Probation for the remainder of their academic career. A student's status on Academic Probation may affect financial aid and be reported to groups that request the information, like Park Scholars, ROTC, graduate schools, etc.

The Computer Science department uses software that detects cheating violations for programming projects. Do not use other student's code, do not share your code, do not copy or use code from someone who took the class X semesters ago, do not use code from online.

The only people that you MAY receive help from are your instructor and the TA(s) for CSC230. You may use any of the resources provided by the teaching staff on the course website.

You MAY also reference your textbook, the textbook website, the C Standard Library documentation, and the C++ Standard Library documentation.

You MAY NOT receive help from anyone or anything else.

Examples of Cheating (this list is NOT exhaustive):

- It is cheating to give any student access to any of your work which you have completed for individual class assignments.
- It is cheating AND plagiarism to use another person's work and claim it as your own. You are expected to complete all assignments on your own, unless otherwise specified in the assignment.
- It is cheating to interfere with another student's use of computing resources or to circumvent system security.
- It is cheating to email, ftp, post on the Internet, bulletin boards, message boards, etc. your work for others to obtain. Do NOT use sites that allow you to "anonymously" post code. Those sites are searchable, and others may find your code (like the teaching staff).
- It is cheating to ask or pay another person or persons to complete an assignment for you.
- It is cheating AND plagiarism to decompile any compiled code and use the decompiled source code as your own. You may also break the law by decompiling code.
- It is cheating AND plagiarism to use code that you find online.
- It is cheating to give another student access to your account (NC State account or others that you use for university work) or to give them your account password.
- It is cheating for you and another student to work collaboratively on an assignment, unless otherwise specified by the assignment.

Examples of NOT Cheating (this list is NOT exhaustive):

- Using the code from the class website (with citations in the comments).
- Using code from other programs YOU wrote.
- Using code from other programs that YOU and a partner wrote as part of assigned exercises.

- Help from TAs or instructor (with citations in the comments).
- Using code from the textbook or textbook website (with citations in the comments).

Example Citations

/* (In file or function level comments)

* I received help from Dr. Heckman on *date* during her office hours. We discussed X.

*/

/*

* The code for this method is based on Exercise Y that I completed with Z on date.

*/

Protecting Yourself

- Do not leave papers lying around your workstation.
- Do not dispose of important papers in the lab recycling bins and trash cans until after the assignment is graded.
- Do not give out your password.
- Do not leave your workstation unattended or forget to log yourself out.
- Do not leave your laptop unattended.
- Do not give other students access to any of your workspace or email them any code.
- Do not give other students access to your course materials or your personal computer.
- Do not email, ftp, or post your code on the Internet, message boards, etc.
- Keep all copies of final and intermediate work until after the assignment is graded.
- Keep all graded assignments until after you receive the final grade for the course.
- Do not discuss implementation details of the assignment with your peers.

Forum Use

The forum is available to ask questions about assignments and tests. **Do NOT post any code to the forum!** The teaching staff reserves the right to edit any student's forum post for inappropriate content.

Academic Honesty

See <http://policies.ncsu.edu/policy/pol-11-35-01> for a detailed explanation of academic honesty.

None.

Honor Pledge

Your name on any test or assignment **or** the electronic submission of an assignment through Moodle or other class courseware system indicates "I have neither given nor received unauthorized aid on this test or assignment."

Electronically-Hosted Course Components

Students may be required to disclose personally identifiable information to other students in the course, via electronic tools like email or web-postings, where relevant to the course. Examples include online discussions of class topics, and posting of student coursework. All

students are expected to respect the privacy of each other by not sharing or using such information outside the course.

Electronically-hosted Components:

The following materials are electronically-hosted for use by students through a combination of Moodle, Wolfware Classic, and Google Docs (through NC State): lecture notes, message boards, electronic submission of assignments, electronic submission of exercises.

EOL provides the video of the lectures for use to both DE and on campus students.

Accommodations for Disabilities

Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, student must register with the Disability Services Office (<http://www.ncsu.edu/dso>), 919-515-7653. For more information on NC State's policy on working with students with disabilities, please see the Academic Accommodations for Students with Disabilities Regulation at <http://policies.ncsu.edu/regulation/reg-02-20-01>.

Non-Discrimination Policy

NC State University provides equality of opportunity in education and employment for all students and employees. Accordingly, NC State affirms its commitment to maintain a work environment for all employees and an academic environment for all students that is free from all forms of discrimination. Discrimination based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation is a violation of state and federal law and/or NC State University policy and will not be tolerated. Harassment of any person (either in the form of quid pro quo or creation of a hostile environment) based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation also is a violation of state and federal law and/or NC State University policy and will not be tolerated. Retaliation against any person who complains about discrimination is also prohibited. NC State's policies and regulations covering discrimination, harassment, and retaliation may be accessed at <http://policies.ncsu.edu/policy/pol-04-25-05> or http://www.ncsu.edu/equal_op/. Any person who feels that he or she has been the subject of prohibited discrimination, harassment, or retaliation should contact the Office for Equal Opportunity (OEO) at 919-515-3148.

Course Schedule

NOTE: The course schedule is subject to change.

Lecture TWH 12:00noon - 1:15pm — Intro and Getting Started — 05/22/2012 - 05/22/2012

Introduction to the class.

Lecture TWH 12:00noon - 1:15pm — C Fundamentals and Console I/O — 05/23/2012 - 05/23/2012

Compiling a C program; console I/O.

Lecture TWH 12:00noon - 1:15pm — Lexical Scanning and Data Types — 05/24/2012 - 05/24/2012

Lexical scanning; data types

Lecture TWH 12:00noon - 1:15pm — Data Types — 05/29/2012 - 05/29/2012

Data types

Lecture TWH 12:00noon - 1:15pm — Expressions, Operators, and Flow of Control — 05/30/2012 - 05/30/2012

Expressions; operators; flow of control

Lecture TWH 12:00noon - 1:15pm — Bitwise Operators — 05/31/2012 - 05/31/2012

Bitwise operators

Lecture TWH 12:00noon - 1:15pm — Arrays in C — 06/05/2012 - 06/05/2012

Arrays

Lecture TWH 12:00noon - 1:15pm — Functions — 06/06/2012 - 06/06/2012

Functions

Lecture TWH 12:00noon - 1:15pm — Exam 1 — 06/07/2012 - 06/12/2012

The on-campus exam is June 7 from noon to 1:15p.

All topics through functions.

Lecture TWH 12:00noon - 1:15pm — Storage and Scope — 06/12/2012 - 06/12/2012

storage; scope

Lecture TWH 12:00noon - 1:15pm — The C Preprocessor — 06/13/2012 - 06/13/2012

C Preprocessor; unit testing in C

Lecture TWH 12:00noon - 1:15pm — Pointers — 06/14/2012 - 06/14/2012

Pointers

Lecture TWH 12:00noon - 1:15pm — Pointers — 06/19/2012 - 06/19/2012

Pointers, pointer arithmetic

Lecture TWH 12:00noon - 1:15pm — Pointers — 06/20/2012 - 06/20/2012

Pointers, function pointers

Lecture TWH 12:00noon - 1:15pm — Debugging (gdb) — 06/21/2012 - 06/21/2012

Debugging; gdb

**Lecture TWH 12:00noon - 1:15pm — String Processing —
06/28/2012 - 06/28/2012**

String processing; string.h

**Lecture TWH 12:00noon - 1:15pm — structs — 07/03/2012 -
07/03/2012**

structs

**Lecture TWH 12:00noon - 1:15pm — Dynamic Memory
Allocation — 07/05/2012 - 07/05/2012**

Dynamic memory allocation

**Lecture TWH 12:00noon - 1:15pm — Data Structures in C —
07/10/2012 - 07/10/2012**

Linked lists

**Lecture TWH 12:00noon - 1:15pm — Exam 2 — 07/11/2012 -
07/17/2012**

The on-campus exam is July 11 from noon to 1:15p.

Covers all topics up through Data Structures in C

**Lecture TWH 12:00noon - 1:15pm — C Standard Library —
07/12/2012 - 07/12/2012**

Standard library functions

**Lecture TWH 12:00noon - 1:15pm — Everything Else —
07/17/2012 - 07/17/2012**

const, enum, typedef, bool, union, functions with a variable number of arguments,
environment variables, bit fields

**Lecture TWH 12:00noon - 1:15pm — Automating Routine
Tasks and Version Control — 07/18/2012 - 07/18/2012**

Automating routine tasks, dependency trees, make, ant, maven, version control, svn

**Lecture TWH 12:00noon - 1:15pm — C++ — 07/19/2012 -
07/19/2012**

C++

**Lecture TWH 12:00noon - 1:15pm — C++ — 07/24/2012 -
07/24/2012**

More C++

**Lecture TWH 12:00noon - 1:15pm — C++ — 07/25/2012 -
07/25/2012**

Even more C++

Lecture TWH 12:00noon - 1:15pm — Performance Optimization — 07/26/2012 - 07/26/2012

Performance optimization, gprof

Lecture TWH 12:00noon - 1:15pm — Secure Coding — 07/31/2012 - 07/31/2012

Secure coding, buffer overflows, tainted user input

Lecture TWH 12:00noon - 1:15pm — Exam Review — 08/01/2012 - 08/01/2012

Exam review

Lecture TWH 12:00noon - 1:15pm — Final Exam — 07/30/2012 - 08/05/2012

The on-campus final exam is August 2 from 1p-4p.

The exam will cover all topics covered in the course.