CSC 230 Course Syllabus

CSC 230 – CSC230: C and Software Tools

Sections 002 & 601

Spring 2015

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. Interpret and explain data types, conversions between data types, and the possibility of overflow and underflow.
6. Explain, inspect, and implement programs using structures such as enumerated types, unions, and constants and arithmetic, logical, relational, assignment, and bitwise operators.
7. Trace and reason about variables and their scope in a single function, across multiple functions, and across multiple modules.
8. 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.
9. Use the C preprocessor to control tracing of programs, compilation for different systems, and write simple macros.
10. Write, debug, and modify programs using library utilities, including, but not limited to assert, the math library, the string library, random number generation, variable number of parameters, standard I/O, and file I/O.
11. Use simple command-line tools to design, document, debug, and maintain their programs.
12. Use an automatic packaging tool, such as make or ant, to distribute and maintain software that has multiple compilation units.
13. Use a version control tools, such as subversion (svn) or Git, to track changes and do parallel development of software.
14. 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

Lecture and Exercises

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. The exercises will be lightly evaluated by the teaching staff.

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.

Each exercise will be scored out of 10 points. A meaningful attempt of the exercise will earn 5 (out of 10) points. All exercises for a lecture will be ***averaged*** together to generate a lecture exercise grade. The lowest ***five*** lecture scores will be dropped, and the remaining scores will be averaged.

If you are absent from class, with an excused university absence, you will not be penalized for missing any exercises *associated* with the class.

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.

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 1/13 and 1/15 will be due by 11:45p on 1/18. The solutions to the exercises and the associated code should be posted the following Monday or Tuesday (for our example that will be 1/19 or 1/20). Exceptions to posting exercise solutions may occur around exams at the discretion of the instructor, where exercise solutions ***may*** be posted early for studying.

Homeworks

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 at least a week for completion.

There are 4 homeworks this semester. All homework deliverables (code modules, test cases, Makefiles, etc.), as specified in the assignment, must be submitted electronically by the due date. Penalties and policies regarding late work submissions are stated in the "Late Work" section of the syllabus.

It is the student's responsibility to ensure that all submissions are made to the appropriate submission tool and that the submission contains the materials that the student wants graded. The teaching staff will evaluate the ***last*** submission made for a project part. Verify all submissions.

If the homework deliverables consist of a coded solution, your program must compile and run on the "Common Platform" as outlined on the course website. Penalties for non-compiling or non-executing deliverables are outlined in the grading rubric for each homework assignment.

All deliverables are to be your own work, unless you are allowed to collaborate with an assigned classmate as described in the assignment (and then the deliverables must be your and your partner's own work). Penalties and policies regarding academic misconduct are defined in the "Academic Integrity" section of the syllabus.

Project

The project will be completed outside of class. The project combines several of the key ideas in CSC230, specifically dynamically allocate linked lists of structs to fulfill a customer need. The project will consist of two parts, and each part will be given at least a week for completion.

Each project part will be submitted electronically through the mediums outlined in the project write up. The second part of the project will likely build on the first part; fixing problems with the first part for the second part may lead to the return of some points for the first part.

It is the student's responsibility to ensure that all submissions are made to the appropriate submission tool and that the submission contains the materials that the student wants graded. The teaching staff will evaluate the last submission made for a project part. Verify all submissions.

Your program must compile and run on the "Common Platform" as outlined on the course website. Penalties for non-compiling or executing deliverables are outlined in the grading rubric for each homework assignment.

All deliverables are to be your own work, unless you are allowed to collaborate with an assigned classmate as described in the assignment (and then the deliverables must be your and your partner's own work). Penalties and policies regarding academic misconduct are defined in the "Academic Integrity" section of the syllabus.

Exams

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

Time

You are expected to spend, on **average**, 6 to 12 hours per week outside of class preparing and working on assignments. In some weeks, especially those around homework deadlines, you may spend more than 12 hours on course work. Please plan and use your time wisely. Do NOT wait until the last minute to complete homeworks!!!

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. You may not record the lecture without express written permission from the instructor.

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 "netequette" 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 or holiday. 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 (search for the string [CSC230], which the instructor will usually include as part of the email subject on class-wide correspondance).
- 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, use one of these options:

- Post a private note to Piazza (preferred)
- Email the support list for your section: csc230-601-sup@wolfware.ncsu.edu

Grade Appeals

If at any time you feel an assignment was graded improperly, **email** a request for regrade to your section's sup list and explain why you believe the assignment was graded improperly. **Do NOT attach any materials to the email; the teaching staff has access to all submitted work for the course including scanned copies of all exams.** The TA(s) that graded the section(s) you have questions about will follow up. If you are still unsatisfied with the answer, respond to the email and directly address the instructor. **All regrade**

requests must be submitted to the teaching staff no later than 2 weeks after the assigned was returned to you. Assignments returned within 2 weeks of the final exam will have until the final exam window closes for regrade requests.

Minimum Grade Requirements

In order to receive a final grade of D- or higher, you must have an average of 50% or higher on all three exams and an average of 50% or higher on all of the Homeworks AND both parts of the project. Students failing to meet these requirements will receive a grade of F for 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:
M from 11:30a-12:30p in EBII 2297
T from 11:00a-noon in Daniels 223

Course Meetings

Lecture

DE students should be watching the lecture videos on approximately the schedule provided in the syllabus and on the course website.

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.

Requisites and Restrictions

Prerequisites

CSC 216 with a C or better
Class is restricted to Computer Science or Computer Science Unmatriculated students only

Grading

Grade Components

Component	Weight	Details
Homeworks and Projects	**45**	There will be 4 homeworks and a two-part project.
Exercises	**5**	Each lecture will have one or more exercises.
Exam 1	**16**	The exam will cover all materials (readings, lecture notes, lecture videos, exercises, and homeworks) for the **first third** of the course.
Exam 2	**16**	The exam will cover all materials (readings, lecture notes, lecture videos, exercises, and homeworks) for the **first two thirds** of the course.

Component	Weight	Details
Final Exam	**18**	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-02-20-04.

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 and projects are required to be submitted by **11:45p** on the specified due date. Late work will be accepted **up to 24 hours** after the due date. The late penalty for a given assignment will be specified in the homework or project writeup. No work will be accepted after the late deadline, **unless you have a documented excused absence**.

Exercises will not be accepted late.

No late submissions will be accepted through email.

Attendance Policy

For complete attendance and excused absence policies, please see http://policies.ncsu.edu/regulation/reg-02-20-03

Attendance Policy

Attendance to lecture is mandatory (this is a 200-level course)! DE students are expected to watch lecture videos on approximately the same schedule as the on-campus lectures. On-campus students will have access to the lecture videos after the lecture is given in the on-campus section.

Absences Policy

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 to excuse an absence.**

- Exam makeups will only be given with a documented excused absence.
- Homework and project extensions will only be given with a documented excused absence. An alternative assignment may be provided depending on circumstances.
- Exercise waivers 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 Policy

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.

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. Letters of recommendation will not be provided for any student that has been found guilty of or admitted to an academic integrity violation in my class(es).

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):

- 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.
- to interfere with another student's use of computing resources or to circumvent system security.
- 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).
- 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.
- 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.
- for you and another student to work collaboratively on an assignment, unless otherwise specified by the assignment.
- to circumvent the intention of the assignment and/or the automated grading system (e.g., by hardcoding test case solutions).

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 an 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 publically 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, Google Docs (through NC State), a teaching staff managed VCL server for automated grading, and Piazza: 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.

Support Fellow Students in Distress

As members of the NC State Wolfpack community, we each share a personal responsibility to express concern for one another and to ensure that this classroom and the campus as a whole remains a safe environment for learning. Occasionally, you may come across a fellow classmate whose personal behavior concerns or worries you. When this is the case, I would encourage you to report this behavior to the NC State Students of Concern website:http://studentsofconcern.ncsu.edu/. Although you can report anonymously, it is preferred that you share your contact information so they can follow-up with you personally.

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.

Intro and C Fundamentals — 1/8/2015

Intro and C Fundamentals

Console I/O, Lexical Rules, and Data Types — 1/13/2015

Console I/O, Lexical Rules, and Data Types

Expressions, Operators, and Flow of Control — 1/15/2015

Expressions, Operators, and Flow of Control

Version Control and Automating Routine Tasks — 1/20/2015

Version Control and Automating Routine Tasks

Type Conversions — 1/22/2015

Type conversions

Storage and Scope — 1/27/2015

Storage and Scope

Arrays — 1/29/2015

Arrays

Pointers Part 1 — 2/3/2015

Pointers Part 1

Functions — 2/5/2015

Functions

Exam 1 — 2/10/2015

The exam will cover all materials through Functions.

The DE exam window is between 2/9/2015 to 2/11/2015. The exam time is 80 minutes.

Pointers Part 2 — 2/12/2015

Pointers Part 2

String Processing — 2/17/2015

String Processing

Pointers Part 3 — 2/19/2015

Pointers Part 3

Dynamic Memory Allocation — 2/24/2015

Dynamic Memory Allocation

Debugging — 2/26/2015

Debugging

Structs — 3/3/2015

Structs

Data Structures Part 1 — 3/5/2015

Data Structures Part 1

C Standard Library — 3/17/2015

C Standard Library

Bitwise Operators — 3/19/2015

Bitwise Operators

Exam 2 — 3/24/2015

The exam will cover all materials through Bitwise Operators.

The DE exam window is between 3/23/2015 to 3/25/2015. The exam time is 80 minutes.

The C Preprocessor — 3/26/2015

The C Preprocessor

Data Structures Part 2 — 3/31/2015

Data Structures Part 2

Encryption and Security — 4/7/2015

Encryption and Security

Security Summary — 4/9/2015

Security Summary

Performance Optimization — 4/14/2015

Performance optimization

C++ Part 1 — 4/16/2015

C++

C++ Part 2 — 4/21/2015

More C++

C++ Part 3 — 4/23/2015

Even more C++

Exam 3 — 5/5/2015

The DE exam window is 5/4/2015 to 5/5/2015. The exam time is three hours.

The exam will cover all topics covered in the course.

Homework 1 Deadline — 1/14/2015

The project is due at 11:45p. Late submissions are allowed for an additional 24 hours.

Homework 2 Deadline — 1/28/2015

The project is due at 11:45p. Late submissions are allowed for an additional 24 hours.

Homework 3 Deadline — 2/18/2015

The project is due at 11:45p. Late submissions are allowed for an additional 24 hours.

Homework 4 Deadline — 3/4/2015

The project is due at 11:45p. Late submissions are allowed for an additional 24 hours.

Project Part 1 Deadline — 4/1/2015

The project is due at 11:45p. Late submissions are allowed for an additional 24 hours.

Project Part 2 Deadline — 4/22/2015

The project is due at 11:45p. Late submissions are allowed for an additional 24 hours.