



Course Syllabus


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Basic Information

Class Meeting Time and Classroom:

- Lecture class: 11:30 AM - 12:45 PM, Tuesday and Thursday, Woodward Hall 140
 - Zoom recording: <https://uncc.zoom.us/j/6698366594?pwd=MVBmOURvRGU1azRwY0lnejVwa2tjUT09>  <https://uncc.zoom.us/j/6698366594?pwd=MVBmOURvRGU1azRwY0lnejVwa2tjUT09>. Meeting ID: 669 836 6594, Passcode: 3181.
- Labs: 2:30 - 3:45PM, Wednesday, Woodward Hall 140
- Check [University Academic Calendar](https://registrar.uncc.edu/printable-calendar?field_semester_tid=7&field_school_year_tid=37)  https://registrar.uncc.edu/printable-calendar?field_semester_tid=7&field_school_year_tid=37 for other important dates and deadlines.

Instructor: [Yonghong Yan](https://cci.uncc.edu/directory/yonghong-yan) , yyan7@uncc.edu

- Office: 210G Woodward Hall
- Phone: 704-687-8546 | Fax: 704-687-1651
- Office Hours:
 - 9:00 AM - 9:45 AM Tuesday and Thursday, 210G Woodward Hall or zoom
 - <https://uncc.zoom.us/j/6698366594?pwd=MVBmOURvRGU1azRwY0lnejVwa2tjUT09>  <https://uncc.zoom.us/j/6698366594?pwd=MVBmOURvRGU1azRwY0lnejVwa2tjUT09>. Meeting ID: 669 836 6594, Passcode: 3181
 - If the above hours do not work for you, send me email to make an appointment

Teaching Assistant and Office Hours:

- Xinyao Yi (xyi2@charlotte.edu)
- Kiriti Amaravadi (kamarava@charlotte.edu (<mailto:kamarava@charlotte.edu>))
- Office Hours:
 - Monday 2:00 PM - 3:30 PM (Kiriti), 211 Woodward Hall
 - Friday 2:00 PM - 3:30 PM (Xinyao), 211 Woodward Hall
 - If the above hours do not work for you, send an email to make an appointment

Textbooks

- **Required:** Dive into Systems (<https://diveintosystems.org>  <https://diveintosystems.org>.)

Course Description

Description and Link from University Catalogs

Introduction to computer system abstractions reflected in programming languages, operating systems, architectures, and networks. Topics include: overview of computer and processor architecture, instruction set architecture and introduction to assembly language, C programming, system calls, processes and process memory layout, interfaces for memory allocation and file systems, file and directory management via the command line, network architecture and protocols (such as HTTP, MAC, IP, DNS).

University Catalog Link: https://catalog.charlotte.edu/preview_course_nopop.php?catoid=36&coid=125266 ↗ (https://catalog.charlotte.edu/preview_course_nopop.php?catoid=36&coid=125266)

Credit Hours: 4

Prerequisites

- ITSC 1212 with grade of C or above or DTSC 1302 with grade of C or above

Topics

- **Module 01: Principles of Computer Architecture and Organization:** Component of a computer system and Von-Neumann architecture; how a high-level program is executed by a computer; what is a computer system;
- **Module 02: File and Directory Management & Command Line:** using the command line for basic file and directory management, including manipulation of file permissions.
- **Module 03: Introduction to C programming:** C programming basics, variables, if-else and for/while loops, functions, array, and structs, stack and heap memory and function call, how a high-level program is compiled, linked and executed in a computer
- **Module 04: Number Systems:** binary, decimal and hex numbers, 2's complement binary representation of positive and negative numbers, and the size of C variables of different types
- **Module 05: Program Memory and C Pointers:** C memory allocation, memory and address for variables, array and struct using, C pointer variable, and using C pointers to access variables, array elements and structs
- **Module 06: Instruction Set Architecture, RISC-V Assembly Programming and Assembly Format of a C Program:** memory and registers of the components of a computer; arithmetic and logic operation instructions; control transfer instructions; and instructions for load data from memory to register and for store data from register to memory; converting core high-level language constructs (if-else, for and while loop, variable and array references) to instruction sequence in assembly.
- **Module 07: Introduction to Operating System, Program Execution and Scheduling:** purpose and responsibilities of an OS, system calls, kernel / user mode; what is a process; process states; examination / demonstration of processes in a Unix system; introduction to concurrent process execution, context switching and multi-threading

Learning Objectives

Following completion of the course, students will be able to:

- **CO1:** Explain the principles, components, progression and performance challenges of computer architecture.
 - **CO2:** Explain the instruction set architecture of a computer system and how an instruction is represented at the machine level and symbolic assembler level.
 - **CO3:** Map major high-level language patterns into assembly/machine language notations.
 - **CO4:** Convert numerical data between different representations including binary, hexadecimal, decimal, and other formats.
 - **CO5:** Write, build and execute C programs.
 - **CO6:** Use the Unix command line for file & directory management.
 - **CO7:** Use system calls in C programs.
 - **CO8:** Explain how hardware and software systems expose high level abstractions to lower level features in the context of system programming.
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Course Delivery Structure and Grading

There are two 75-minute lectures per week, which constitutes 100% of the in-class activities. Lectured is planned to be recorded for offline study and review, available from Canvas "Media Gallery". There is one lab session per week in which TAs will support students for their assignments and programming exercises.

Course Prep Quizzes, Labs, Exercises, Tests and Final Exam

There are lab assignment that you can do during the lab and afterwards. We also plan to have four tests and one cumulative final exam. They all should be individual effort. The contribution of each to your final grades are shown below. Questions with bonus points may be given. Knowledge check quizzes, exercises and lab should be submitted on Canvas. Tests and final exam are given as paper-based test.

- Knowledge Check (pre-class quizzes): 5%
- Exercises: 15%
- Labs : 25%
- Four Tests and Final Exam: 55%

Mapping Between Letter Grade and Percentage Grade

Letter Percentage

A	90-100
B	80-90

Letter Percentage

C	70-80
D	60-70
F	0-60

Policies and Procedures

Code of Student Responsibility

Please refer to [Code of Student Responsibility](https://legal.uncc.edu/policies/up-406) [↗\(https://legal.uncc.edu/policies/up-406\)](https://legal.uncc.edu/policies/up-406) for expectation and guideline from the university for students. Failure to follow these expectations may constitute a violation of the Code of Student Responsibility. All students should review these behavioral expectations, along with the procedure for reporting and addressing noncompliance with those expectations. The link for the [Code of Student Responsibility](https://legal.uncc.edu/policies/up-406) [↗\(https://legal.uncc.edu/policies/up-406\)](https://legal.uncc.edu/policies/up-406) is <https://legal.uncc.edu/policies/up-406> [↗\(https://legal.uncc.edu/policies/up-406\)](https://legal.uncc.edu/policies/up-406).

Due Date and Late Policy

All the quizzes, exercises, and lab assignments must be submitted from Canvas. The due data/time for each items will be set according to the progress. Request for makeup test or for deadline extensions must be submitted by emailing the instructor **before the test date or due date** in order to be considered. NO request made after test date or due date will be considered. Only medical/health/urgency/emergency reasons are considered for such request. Late submission will be accepted before the canvas closes it, but with 50% penalty. NO late submission will be accepted after the canvas closes it.

Class Policies

Reading and lectures: The students are expected to read all assigned material before the lecture begins and review the material after the lecture.

Attendance Policy

Class and lab are all required to attend for effective study. If for some reason you cannot attend class, you are responsible for any material covered during your absence. Late arrivals must enter the classroom quietly and discreetly.

Tests and exams

Tests and exam will be given on paper. No makeup tests or exam will be considered except under circumstances such as accident, illness or death in the immediate family in which case you must give me

notice or proof well before the test or the exam if at all possible.




Proper Use of Computing Resources

Students are expected to be aware of the university policy on use of computing resources, including the Student Guidelines for Responsible Computing, as well as the college and departmental policies on proper use of computing resources. Every instance of a suspected violation will be reported.

Course Material Use

Most lectures and course material will be available on the course website. Assignments will be posted on Canvas and submission of assignments MUST be done from Canvas (email and print-copy submission are not accepted). Students must check the website periodically for postings and announcements. Lectures and course materials, including presentations, tests, exams, outlines, and similar materials, are protected by copyright. Students may take notes and make copies of course materials for their own educational use. However, students are not allowed to, nor knowingly allow others to reproduce or distribute lecture notes and course materials publicly without express written consent of the instructor(s). Students who publicly distribute or display or help others publicly distribute or display copies or modified copies of an instructor's course materials are in violation of University Policy.

Academic Integrity

Examination work and assignment are expected to be the sole effort of the student submitting the work. Students are expected to follow the [UNC Charlotte Code of Student Academic Integrity](http://legal.uncc.edu/policies/up-407)  (<http://legal.uncc.edu/policies/up-407>) for all class activities, assignments and tests. This includes following all of the instructions given by the course instructor, TAs, and other test proctors. All tests must be completed at the testing area. The link to the [UNC Charlotte Code of Student Academic Integrity](http://legal.uncc.edu/policies/up-407)  (<http://legal.uncc.edu/policies/up-407>) is <http://legal.uncc.edu/policies/up-407>  (<http://legal.uncc.edu/policies/up-407>).

Prohibited behaviors include plagiarism, cheating, falsification, and complicity. All cases of potential academic misconduct will be reported to the Dean of Students Office. **If any of the prohibited behaviors is caught, or reported and proved, the persons who cheat and those who help cheating fail the course.**

Disability Services

UNC Charlotte is committed to access to education. If you have a disability and need academic accommodations, please send me your accommodation letter as early as possible. You are encouraged to meet with me to discuss the accommodations outlined in your letter. For more information on accommodations, contact the Office of Disability Services at 704-687-0040 (Fretwell 230).

Non-Discrimination

No student will be discriminated against in this class based on age, race, nationality, religion, sexual orientation, gender identity/expression, veteran's status, country of origin, or group affiliation. Any student who does not behave in a respectful manner may be asked to leave the classroom. Continuous or repeated disrespectful behavior will be considered to be creating a hostile environment, which constitutes a violation to the University Policy 406, Code of Student Responsibility. Such a student will be referred to the Office of Student Conduct or the Title IX Office. Based on such referral, the Director or designee will determine whether a Formal Charge(s) shall be pursued and whether the Formal Charge(s) constitutes a Minor Violation or a Serious Violation, based on the Student's prior record or facts and circumstances related to the case.

Syllabus Revisions

The course instructor may modify standards and requirements set forth in this syllabus at any time. Notice of such changes will be by announcement to the class.