# University of North Texas

# Department of Computer Science and Engineering

# CSCE 3600:002 – Principles of Systems Programming

Classes: Monday and Wednesday: 8:30 am – 9:50 am

Room: NTDP K110

## Instructor Information

Name: Dr Subharag Sarkar

Office: NTDP E245C

Email: Subharag.sarkar@unt.edu

Student Hours:

Monday and Wednesday: 12:30 pm to 1:30 pm at GAB 330.

<https://unt.zoom.us/j/82114151218>

Tuesday: 3:00 pm to 5:00 pm NTDP E245C.

<https://unt.zoom.us/j/89270409997>

If you are unable to meet during this time, email the instructor to set an alternate meeting time

## TA/IA Information

Refer to the Canvas Module for information on all the TA and IA

## Course Description, Prerequisite and Learning Outcome

Introduction to the design and operation of systems software. Analysis is made of current system software technology, including operating systems, language translation systems and file systems.

**Course Description**

CSCE 3600 maintains a focus on systems programming, both from the standpoint of learning about how computer system software works and learning/improving students' programming skills in K&R C and bash (Bourne-again shell). The course will include one or more major programming projects that will be completed in groups as well as several smaller programming assignments to be done individually.

**Course Prerequisites**

CSCE 2100 and CSCE 2110, with a grade of C or better.

**Course Objectives:**

Course outcomes are measurable achievements to be accomplished by the completion of a course. These outcomes are evaluated as part of our ABET accreditation process.

1. Write robust, efficient, readable, and correct system software using the C programming language.

2. Demonstrate an understanding of processes and threads by developing applications using multiple processes and multi-threaded activities in a Linux environment.

3. Demonstrate an understanding of deadlocks and synchronization through the development of application(s) that utilize a variety of mutual exclusion mechanisms.

4. Develop shell scripts and utilities that demonstrate an understanding of memory, file and process management and interaction, including concepts such as virtual memory and disk scheduling.

5. Create a Linux-based application that utilizes inter-process communication mechanisms such as pipes and sockets to communicate information between independently running processes on one or multiple platforms.

6. Demonstrate an understanding of the use and interaction among compilers, macro processors, assemblers, linkers and loaders through their use in creating the applications described in previous outcomes.

**Course Evaluation**

Student Perceptions of Teaching (SPOT) is the student evaluation system for UNT and allows students the ability to confidently provide constructive feedback to their instructor and department to improve the quality of student experiences in the course.

## Academic Accommodation

The University of North Texas makes reasonable academic accommodations for students with disabilities. Students seeking reasonable accommodation must first register with the Office of Disability Access (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with a reasonable accommodation letter to be delivered to the faculty to begin a private discussion regarding your specific needs in a course. You may request reasonable accommodations at any time; however, ODA notices of reasonable accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of reasonable accommodation for every semester and must meet with each faculty member prior to implementation in each class. Students are strongly encouraged to deliver letters of reasonable accommodation during faculty office hours or by appointment. Faculty members have the authority to ask students to discuss such letters during their designated office hours to protect the privacy of the student. For additional information, refer to the Office of Disability Access website (https://studentaffairs.unt.edu/office-disability-access). You may also contact ODA by phone at (940) 565-4323.

## Supporting Your Success and Creating an Inclusive Learning Environment

UNT strives to offer you a high-quality education and a supportive environment, so you learn and grow. As a faculty member, I am committed to helping you be successful as a student. To learn more about campus resources and information on how you can be successful at UNT, go to unt.edu/success and explore unt.edu/wellness. To get all your enrollment and student financial-related questions answered, go to scrappysays.unt.edu.

I value the many perspectives students bring to our campus. Please work with me to create a classroom culture of open communication, mutual respect, and belonging. All discussions should be respectful and civil. Although disagreements and debates are encouraged, personal attacks are unacceptable. Together, we can ensure a safe and welcoming classroom for all. If you ever feel like this is not the case, please stop by my office and let me know. We are all learning together. I also encourage you to review UNT’s student code of conduct so that we can all start with the same baseline civility understanding (Code of Student Conduct) (https://policy.unt.edu/policy/07-012).

## Required/Recommended Materials

**Reference Textbook.**

1. System Programming with C and Unix, First Edition, by Adam Hoover, Addison-Wesley, 2010. ISBN 978-0-13-606712-2.

2. Understanding the LINUX Kernel, 3rd edition, by Daniel P. Bovet & Marco Cesati, O’Reilly, 2005. ISBN 978-0-596-00565-8.

3. Advanced Programming in the UNIX Environment, 3rd edition, by W. Richard Stevens and Stephen A. Rago, Addison-Wesley, 2013.

## Course Requirements/Schedule

**Procrastination Policy:**

Students are provided an appropriate window of time to complete each assignment from its official posting date to its due date. Once posted, students are expected to attempt assignments promptly, so that they may seek assistance to identify and resolve any issues in an efficient and timely manner. Therefore, the instructor or TAs are not required (but may choose to, if willing and able) to answer emails regarding a particular assignment after 4:00 pm CDT on its due date. After 4:00 pm CDT on the published due date, it will be assumed that the student is able to complete the assignment successfully. This policy is to ensure that students attempt the assignment before the actual due date, so that they may seek any needed assistance without procrastinating.

**Assignments:**

*Most programming assignments will be due at* ***11:59 PM on the specified due date*** *to Canvas. All assignments must be completed and submitted according to their specific directives.* ***Only C programming language is allowed for the assignments (unless use of any other language is specified).*** *This is applicable for Recitation, Assignments, Minor Programming Assignments, Major Programming Assignments and Exams.*

**Recitation Assignments:**

*Recitation assignments are meant to serve as preparatory assignments for upcoming minor and major assignments that can be completed in a relatively short amount of time. Students may complete these assignments on their own or by attending their scheduled recitation where they may receive guidance from a TA/IA on completing. Please note that any programming portion of an exam will be given during each recitation section during the week of the scheduled exam, in which case attendance will be required.*

**Minor Programming Assignments:**

*Minor programming assignments will be assigned based on the material from the lectures and textbook. These are meant to be individual programming assignments, so you should work on these alone unless explicitly directed otherwise by your instructor.*

**Major Programming Assignment:**

*Major programming assignments will be worked on in a group and are meant to be more comprehensive problem-solving exercises based on the material from the lectures.*

**Quizzes:**

*Students should expect at least eight quizzes that may be taken through Canvas. Quiz grade will be the average of all quizzes.*

**Exams:**

*There will be three examination in this course. The dates of this exam will be posted on Canvas and announced in class at least one week prior to the date of the exam. Tentative dates (which will mostly remain the final dates) are posted in the schedule table below. Unexcused absences on the date of an exam may result in a grade of 0 for the missed exam, so every effort should be made to attend class on the day of a scheduled exam.*

Lockdown Browser will be used for quizzes and exams conducted over Canvas

**Late Submission Policy:**

Assignments may be turned in late, but not more than 5 days. All the late submissions will lose 20% of the grade for each extra day.

**On-time:** **0%**

**Each extra day: 20% per day**

**Class Policy:**

**1.** Emails will be answered as promptly as possible.

**2.** Student behavior that interferes with an instructor’s ability to conduct a class or other students’ opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum at UNT. Students engaging in unacceptable behavior will be directed to leave the classroom and the instructor may refer the student to the Center for Student Rights and Responsibilities to consider whether the student’s conduct violated the Code of Student Conduct. The university’s expectations for student conduct apply to all instructional forums, including university and electronic classrooms, labs, discussion groups, field trips, etc. The Code of Student Conduct can be found at <https://policy.unt.edu/policy/07-012>

**3.**Usage of cell phones, earphones, and other electronic devices, during exams is strictly prohibited. The usage of laptops and tablets is permitted for class purposes. Usage of classroom computers, if any, are not allowed, while the class is in session. Any student who uses an unauthorized device will lose 1 point (out of 100) and may be asked to leave the classroom.

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| Date | Topics |
| 08/18/2025 | **Introduction** |
| 08/20/2025 | **Systems Programming Overview** |
| 08/25/2025 | **Linux Overview** |
| 08/27/2025 | **RegEx** |
| 09/01/2025 | **Labor Day Holiday** |
| 09/03/2025 | **RegEx Practice** |
| 09/08/2025 | **Sed**  |
| 09/10/2025 | **Sed Practice** |
| 09/15/2025 | **Gawk** |
| 09/17/2025 | **Gawk Practice** |
| 09/22/2025 | **Bash** |
| 09/24/2025 | **Bash** |
| 09/29/2025 | **Processes** |
| 10/01/2025 | **Processes** |
| 10/06/2025 | **Review** |
| 10/08/2025 | **Exam I**  |
| 10/13/2025 | **Threads** |
| 10/15/2025 | **Threads** |
| 10/20/2025 | **IPC Part 1** |
| 10/22/2025 | **IPC Part 1** |
| 10/27/2025 | **Review** |
| 10/29/2025 | **Exam II** |
| 11/03/2025 | **IPC Part 2** |
| 11/05/2025 | **IPC Part 2** |
| 11/10/2025 | **Compilers** |
| 11/12/2025 | **Compilers** |
| 11/17/2025 | **Python** |
| 11/19/2025 | **Python** |
| 11/24/2025 | **Thanksgiving Break Holiday** |
| 11/26/2025 | **Thanksgiving Break Holiday** |
| 12/01/2025 | **Review** |
| 12/03/2025 | **Exam III** |

**This schedule is tentative and subject to change at the instructor’s discretion.** Changes will be announced in class. The instructor reserves the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course. **EXAM I, II and EXAM III will be held at regular class time in the same location as lectures.** Students should be prepared to be available till the end of Finals Week in case of any changes to the Last Exam scheduling. In case of campus closing, you will be alerted by Eagle Alert. For more information, you can read the following policy [Campus Closures Policy](https://policy.unt.edu/policy/15-006) (<https://policy.unt.edu/policy/15-006>).

## Assessing Your Work

**Exam Absence policy**

Absence from exams may be excused, with appropriate documentation, for illness, critical family emergencies, military service obligations, observance of major religious holidays, and certain university service commitments. Requests for excused absence, and documentation for such absences, must be provided as soon as possible. In case of an excused absence, the instructor will set up a makeup exam on a date before the last day of finals week. Even if the reason for an absence/non-attendance is valid, a request for an excused absence/re-attempt will be rejected if provided later than the day of the exam. The dates for all the exams are subject to change. Any changes will be announced in class at least a week in advance. Students are expected to be available till the last day of finals week. No accommodations will be made if the student misses an exam due to being unavailable before the last day of finals week.

**Academic Dishonesty Policy**

Work handed in for grade (homework, project report, etc.) MUST BE YOUR OWN effort only. Students are NOT allowed to use online solutions from previous course offerings, websites (including ChatGPT), etc. This will be strictly checked and enforced. The following consequences will be applied if you are caught colluding or copying in the assignments (or exams).

Per offense:

• You will be given a score of -100 points for that assignment (or exam)

• An academic integrity violation form will be filed.

Please read and follow this important set of [guidelines for your academic success](https://policy.unt.edu/policy/06-003) (<https://policy.unt.edu/policy/06-003>). If you have questions about this or any UNT policy, please email me or come discuss this with me during my office hours.

**Grading Information**

Grades are based on mastery of the content. As a rule, I do not grade on a “curve” because that is a comparison of your outcomes to others. However, I encourage you to find opportunities to learn with and through others. Explore [Navigate’s Study Buddy](https://navigate.unt.edu/) (<https://navigate.unt.edu>) tool to join study groups. Maximize your learning with our coaching staff at the Learning Center.

**AI Policy**

In all academic work, the ideas and contributions of others must be appropriately acknowledged and work that is presented as original must be, in fact, original. Using an AI-content generator (such as ChatGPT, GitHub CoPilot, Cody, Ghostwrite and others) to complete coursework without proper attribution or authorization is a form of academic dishonesty. If you are unsure about whether something may be plagiarism or academic dishonesty, please contact your instructor to discuss the issue. Faculty, students, and administrative staff all share the responsibility of ensuring the honesty and fairness of the intellectual environment. For this course you must cite any work performed by others, including AI entities. If you would like to use AI entities exclusively to complete your homework and other assignments, realize you must, of course, cite this when you submit your assignment. Also realize you are still responsible for making sure an coding assignments execute properly. Also, all AI-only assignments will be graded on a different scale, where the highest possible grade you can achieve on any assignment is a 70. Grading rubrics will be scaled accordingly. This does not apply to any exams, as you must do those without outside assistance. Failure to cite any sources, including AI assistance, will result in a -100 for
the first occurrence, and a failing grade in the class (and reporting the Academic Integrity violations to the Dean of Students) for any subsequent occurrence

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| Material | Contribution to Final Score |
| Recitation Assignments  | 15% |
| Minor Programming Assignments | 20% |
| Major Programming Assignments | 20% |
| EXAM I | 10% |
| EXAM II | 10% |
| EXAM III | 10% |
| LAB Attendance (85% Attendance) | 5% |
| Class Attendance (85% Attendance) | 5% |
| Quiz | 5% |

Grading scale:

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| --- | --- |
| Numerical Score | Grade |
| >=90 | A |
| >=75 & <90 | B |
| >=60 & <75 | C |
| >=50 & <60 | D |
| Otherwise | F |

Grades will be posted on Canvas throughout the semester to provide an ongoing assessment of student progress, though final assessment will be measured using the weighted average above. For the Exams and Assignments, any appeals on grades (except the last one) must be made online no later than seven days after the grades are published. Appeals should be as specific as possible and must contain a valid reason. Appeals such as “I think I deserve more for this assessment, or my overall grade has reduced as a result of this assessment” are NOT valid reasons, and such appeals will not be processed. Students are expected to keep track of their performance throughout the semester and seek guidance from available sources (including the instructor) if their performance drops below satisfactory levels. Grading is done carefully, and, in most cases, appeals will not result in a change of mark. **No makeup exams or assignments will be provided for the purpose of bumping up your grade under any circumstances.**

## Attendance and Participation

*Research has shown that students who attend class regularly are more likely to be successful. You should attend every class unless you have a university-excused absence such as active military service, a religious holy day, or an official university function as stated in the* [S*tudent Attendance and Authorized Absences Policy (PDF)*](https://policy.unt.edu/policy/06-039) *(*[*https://policy.unt.edu/policy/06-039*](https://policy.unt.edu/policy/06-039)*). If you cannot attend a class due to an emergency, please let me know.*  *Students who enter class 10 minutes after class starts, will be marked absent for that day.*