CS/SE 3377.006 Systems Programming in Unix and Other Environments

Tuesdays & Thursdays 11:30 AM - 12:45 PM - GR 2.302

Website: elearning.utdallas.edu (activities, assignments, grades, etc.)

Box folder for slides: utdallas.box.com/v/cs3377-006-S25

Programs: ~veerasam/linux6 directory in cs1/cs2/cs3 Linux servers

Instructor	Dr. Jey Veerasamy *Online Office hours* (MS Teams utd.link/jey): TBD *Communication:* MS Teams chat (preferred) or email jeyv@utdallas.edu
TA	TBD

Course Description

CS 3377 Systems Programming in UNIX and Other Environments (3 semester credit hours)

Basic UNIX concepts, commands and utilities, organization of UNIX file system including links and access control, creating and managing UNIX processes and threads, implementing algorithms using shell scripts, basic networking concepts including socket and client-server programming, inter-process communication using pipes and signals, using a version control system to manage work, and introduction to cloud computing. Design and implementation of a comprehensive programming project is required. (Same as **SE 3377**)

Prerequisite: CS/CE 2336/2337 with a grade of C or better or equivalent.

Notes: CS 1336 (Programming Fundamentals) --> CS 1337 (Computer Science I) --> CS 2336/2337 (Computer Science II) is the sequence of programming courses offered by UT Dallas CS. So, you should have completed CS1336 & CS1337 or CS2337 in C/C++ programming and/or have a proficient programming experience with C/C++. Without prior experience in C/C++, this course will be challenging - be ready to invest additional hours for this course!

Student Learning Objectives/Outcomes

1. Ability to use Unix/Linux operating system (command line interface, shell scripting, regular expression).

2. Ability to use Unix/Linux programming environment and development tools.

3. Ability to program with Unix/Linux processes, threads, and inter-process communication facilities.

4. Ability to program with Unix/Linux file system, file input and output, and redirection.

5. Ability to develop programs for network environment (client-server model, socket programming, and cloud computing).

Required Textbooks and Materials

Both books are available online & free via UTD Library => eBook => O'Reilly Online Learning (need to login with UTD email address to access these ebooks):

1. *A Practical Guide to Linux® Commands, Editors, and Shell Programming*, 3ed.

   Mark G. Sobell. Prentice Hall. © 2012. ISBN-10: 0-13-308504-X. ISBN-13: 9780133085044

Note. 4ed is also available and acceptable. This book is referred as [Sobell].

Sobell source code: http://www.sobell.com/CR3

https://learning.oreilly.com/library/view/practical-guide-to/9780134774626

2. *Advanced Programming in the UNIX® Environment*, 3e. W. Richard Stevens and Stephen A. Rago. Addison-Wesley. © 2013. ISBN-10: 0-321-63773-9. ISBN-13: 9780321637734 This book is referred as [APUE].

APUE source code: http://www.apuebook.com/code3e.html

https://learning.oreilly.com/library/view/advanced-programming-in/9780321638014

TENTATIVE Academic Calendar*

Week #	TOPIC/LECTURE

1	Course Syllabus & Course Introduction • Prerequisite Form • Unix/Linux Introduction • First log in to cs1.utdallas.edu (or cs2/cs3) (install mobaXterm, teraterm, putty …) • Simple C programming with hello.c
2	Unix/Linux Introduction & Commands • Learn basic Unix/Linux Commands • Simple File editing with vi editor (Sobell Ch6)
3	Unix, Linux Commands (Advanced) File Systems (Sobell Ch4) Shell (Sobell Ch5) Makefile
4	Bourne Again Shell – Bash shell (Sobell 8, 10) Shell Script Programming with bash
5	Unix/Linux System Prog & API APUE Ch01
6	Unix File Systems and IO, and API (APUE Ch03-Ch04)
7	Pointers & Memory management **Test 1 on Date TBD**
8	Unix/Linux Process (APUE Ch07-Ch08)
9	Shell and Signal (APUE Ch09-Ch10)

10	Thread Programming (APUE Ch11)
11	Inter-process Communication (APUE Ch11.6 & Ch15)
12	Socket Programming (APUE Ch16)
13	Socket Programming Client-Server
14	Concurrent Server **Test 2 on Date TBD**
15	Advanced Topics: Cloud Computing, VCS (Git, Github, etc), Oracle VirtualBox

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Grading Policy

Here is the standard mapping used for mapping the weighted total to letter grades in UTD. You have to earn

Course credit is only given for work assigned in the course schedule. No extra work will be assigned nor will extra credit be given for any extra work performed by a student.

Tests	50%	There will be 2 tests (Test1 25% and Test2 25%) We will use Lockdown Browser to take the tests. Each test will have 40-50 multiple-choice / fill-in-the-blank questions. There will be a few bonus questions to reduce your stress 🙂 Any make-up tests will be arranged and scheduled during the same week at the discretion of the instructor. There should be a valid reason

		(like Dr note, official off-site event participation, etc.) for scheduling make-up tests & you need to coordinate with the instructor. All other scenarios will result in 20% penalty & the makeup test may be tougher than the regular one. Most of the questions will be closely related to the class content and the assignments. So, the best way to prepare for the test will be to attend each class & pay attention, complete the activities and weekly assignments & get your doubts clarified in timely manner. No extra preparation is needed for the tests!
Assignments	30%	There will be weekly assignments, most of them due on Fridays & they will have equal weightage – all of them together will contribute 30% to the final weighted grade. Right way to approach any programming assignment is to start right away & ask for help when you get stuck (you can approach the instructor or TA for help during office hours - we will help you "just enough" to get the past glitch and enable you to complete the remaining stuff on your own). Do not waste hours trying to fix a small glitch or do not use ChatGPT or web resources either! In simple words, your approach will determine whether the programming assignments provide an enjoyable learning experience or end up as painful & seemingly useless activities. One more thing: The more you complete the assignments on your own, the better prepared you'll be for the exams! Plagiarism has no place in the college education. UTD policies require all the professors to forward all suspicious cases to academic disciplinary committee. If the instructor believes a student has committed an act of plagiarism, student will be referred to UTD administration directly - Review utdallas.edu/conduct/integrity & utdallas.edu/conduct/manage-dishonesty for details. So, do not copy the code from others or use ChatGPT or web resources too much - do not share your code with others either - you can utilize ChatGPT-like resources when you go to the real job! Complexity level of each assignment will vary – each assignment may take several hours to complete. You are expected to start working on them as soon as they are posted so that you have "enough" time to work through the glitches, get the necessary help & still manage to submit on time. Do not expect me or the TA to rescue you at the 11th hour! Late submissions will be accepted with 10% penalty for 3 additional days

		(until Monday night). If you cannot complete an assignment due to medical condition, send the Doctor note to the professor using MS Teams chat. You will be given a few additional days to complete the assignment.
Activities	20%	There will be 2 to 5 activities every week to ensure that you are keeping up with the class content (complete in-class activity, complete tutorials at home, finish simple exercise or take online quiz etc.) So, bring your laptop to every class - all the activities will contribute equally & together they will account for 20% of your final grade. Activities ensure that you are keeping up with the course - they cannot be made up after the deadline! In other words, late submissions will NOT be accepted, however 3 lowest scores will be dropped when computing the final grade, to cover common issues like car-trouble, overslept, occasional health issue, etc. You should be able to earn full 30% if you attend all the sessions & complete all the activities. If you cannot complete an activity due to medical condition, send the Doctor note to the professor using MS Teams chat. When the semester ends, if you had >3 excused absences, let me know - I will update your grades for activities.

Here is the standard mapping used to map the weighted total to letter grades in UTD. Final grade should be earned - while I may do a few minor adjustments in the end, I do not plan on curving your weighted total.

A+ >= 97	97 > A >= 94	94 > A- >= 90
90 > B+ >= 87	87 > B >= 84	84 > B- >= 80
80 > C+ >= 77	77 > C >= 74	74 > C- >= 70
70 > D+ >= 67	67 > D >= 64	64 > D- >= 60
60 > F		

Weighted total in your gradebook shows the current weighted grade based on your graded work. For example, if we have only 2 graded assignments & 2 weeks of activities so far, current grade will be based on only those entries.

Your weighted total & corresponding letter grade will continue to change (go up & down) throughout the term as more graded items are included. So, do not be surprised!

Course & Instructor Policies

TA will be responsible for grading all the assignments & the instructor will be responsible for grading the activities and tests. So, contact the TA directly using MS Teams chat for any grading related discrepancies for the assignments. It may not be possible to give a detailed feedback for each weekly assignment due to large number of students enrolled in our classes. If you need more details/clarification, please meet the TA/instructor online during office hours or message us using MS Teams. While almost all activity submissions will get full points, we may randomly check the submissions and reduce the grade if your submission is not relevant to the activity.

You should attend the virtual office hours of TAs and professor to get help for weekly assignments. MS Teams chat messages or emails are NOT recommended. We expect to complete grading assignments (projects), weekly activities or quizzes, and tests in a week or so. However, when the schedule gets too busy, it can be as long as 2 weeks before the grades are assigned. I encourage you to click on My Grades every week and double-check your scores and ask for clarifications right away when you see something wrong.

Class Recordings

Instructor will try to record all the sessions in MS Teams so that all students can use them for future reference. If the instructor or a UTD school/department/office plans any other uses for the recordings, consent of the students identifiable in the recordings is required prior to such use unless an exception is allowed by law.

Comet Creed

This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same: “As a Comet, I pledge honesty, integrity, and service in all that I do.”

Plagiarism has NO place in the college education! UTD policies require all the professors to forward all suspicious cases to academic disciplinary committee. No exceptions. So, do not copy the code from others & do not give your code to others.

Please review the UTD policy and guideline on Student behavior and conduct, academic honesty and integrity in https://www.utdallas.edu/conduct/integrity/ and UTD BAIT team in https://www.utd.edu/conduct/bait/

Academic Support Resources

The information contained in the following link lists the University's academic support resources for all students. Please see http://go.utdallas.edu/academic-support-resources.

UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus. Please go to http://go.utdallas.edu/syllabus-policies for these policies.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.