Course Syllabus

Course Information

CS/SE 3377.0W1 – C/C++ Programming in a UNIX Environment

Term: **Fall 2021**
Days & Time and Location: Online

Instructor Contact Information

Nhut Nguyen, *Ph.D.*
Phone: *972-883-4521*
Email: *nhutnn@utdallas.edu*
Office hours: (via MS-Teams) TTh 4:00PM – 5:00PM, *also by appointment* using MS-Teams

Course Pre-requisites, Co-requisites, and/or Other Restrictions
(CE 2336 or CS 2336 or TE 2336) with a grade of C or better, or equivalent.

Course Description

Advanced programming techniques utilizing procedural and object oriented programming in a UNIX environment. Topics include file input and output, implementation of strings, stacks, queues, lists, and trees, and dynamic memory allocation/management. Design and implementation of a comprehensive programming project is required.

Student Learning Objectives/Outcomes

After successful completion of this course, the student should have

- Ability to use the UNIX operating system interactively as a user (commands)
- Ability to express algorithmic solutions using shell scripting (utilities)
- Ability to understand and use regular expressions
- Ability to use the UNIX programming environment (editor, compiler and linker)
- Ability to understand UNIX processes (creation and control)
- Ability to perform input/output of binary files
- Ability to use inter-process communication (pipes, sockets and signals)
- Ability to understand the UNIX file system
- Ability to understand and use version control system

Required Textbook and Materials:

Required Textbooks

1. *"A Practical Guide to Linux® Commands, Editors, and Shell Programming, Third Edition"*, Mark G. Sobell. Prentice Hall. © 2012. ISBN-10: 0-13-308504-X. ISBN-13: 9780133085044
   https://learning.oreilly.com/library/view/practical-guide-to/9780134774626

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

(Available online & free via UTD Library => eBook => O'Reilly Online Learning)
This book is referred as [Sobell].
Note: The 4th Edition of this book is also available and acceptable.

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

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

(Available online & free via UTD Library => eBook => O'Reilly Online Learning)
This book is referred as [APUE].

Required Materials and/or Recommended Books

1. The Linux Programming Interface. Michael Kerrisk. © 2010 No Starch Press. ISBN 978-1-59327-220-3
   (Available online & free via UTD Library => eBook => Safari). This book is referred as [LPI].

2. Introducing Python. Bill Lubanovic. © 2014 O'Reilly Media, Inc. ISBN-13: 978-1-4493-5936-2
   (Available online & free via UTD Library => eBook => Safari). This book is referred as [Python].

3. Unix® and Linux® System Administration Handbook, Fourth Edition, Video Enhanced Edition. by Evi Nemeth; Garth Snyder; Trent R. Hein; Ben Whaley. © 2010 Prentice Hall. ISBN-10: 0-13-148005-7. ISBN-13: 978-0-13-148005-6
   (Available online & free via UTD Library => eBook => Safari). This book is referred as [Handbook].

4. The Sockets Networking API: UNIX® Network Programming. Vol 1, 3ed. W. Richard Stevens, Bill Fenner, Andrew M. Rudoff. © 2003 Addison-Wesley Professional. ISBN-10: 0-13-141155-1. ISBN-13: 978-0-13-141155-5. Source code: http://www.unpbook.com/
   (Available online & free via UTD Library => eBook => Safari) This book is referred as [Network].

5. Gaddis, Starting Out with C++ From Control Structures through Objects (with Access) 8th edition. ISBN-10: 0133796337 • ISBN-13: 9780133796339. (7th edition is OK, 0132576252)
   (This is the textbook for your cs1336 and cs1337 courses. We will review ch12-19 mostly with ppts).

6. C++ How to Program, 10/e. by Paul Deitel and Harvey Deitel. © 2016 Pearson. ISBN-13: 978-0-13-444823-7. ISBN-10: 0-13-444823-5
   (Available online & free via UTD Library => eBook => Safari). This book is referred as [Deitel].

7. C++ Programming Language. 4/e. Stroustrup ©2014 Addison-Wesley ISBN-10: 0321958322.
   ISBN-13: 9780321992789
   (Available online & free via UTD Library => eBook => Safari)

8. The C++ Programming Language, 4ed. Bjarne Stroustrup. © 2013 Addison-Wesley Professional. ISBN-13: 978-0-321-56384-2
   (Available online & free via UTD Library => eBook => Safari)

9. A Tour of C++. Bjarne Stroustrup. © 2013 Addison-Wesley Professional. ISBN-13: 978032195831.
(Available online & free via UTD Library => eBook => Safari)

10. C for Programmers with an Introduction to C11. Harvey Deitel and Paul Deitel. © 2013 Prentice Hall, ISBN-10: 0-13-346206-4. ISBN-13: 978-0-13-346206-7
    (Available online & free via UTD Library => eBook => Safari)

11. 21st Century C, 2ed. Ben Klemens. © 2014 O'Reilly Media, Inc. ISBN-13: 978-1-4919-0389-6
    (Available online & free via UTD Library => eBook => Safari)

12. Intermediate C Programming. Yung-Hsiang Lu. © 2015 CRC Press. ISBN 978-1-4987-1163-0.
    (Available online & free via UTD Library => eBook => Safari)

13. Using SQLite. Jay A. Kreibich. © 2010 O'Reilly Media, Inc. ISBN-13: 978-0-596-52118-9
    (Available online & free via UTD Library => eBook => Safari)

14. flex & bison. John Levine. © 2009 O'Reilly Media, Inc. ISBN 9780596805418
    (Available online & free via UTD Library => eBook => Safari) This book is referred as [FlexBison].

15. Unix Systems Programming: Communication, Concurrency, and Threads. Kay A. Robbins; Steven Robbins. © 2003 Prentice Hall. ISBN-10: 0-13-042411-0. ISBN-13: 978-0-13-042411-2
    (Available online & free via UTD Library => eBook => Safari) This book is referred as [USP].

Online Resource and Web Sites

Sobell source code: http://www.sobell.com/CR3/
APUE source code: http://www.apuebook.com/code3e.html
Computer Systems: http://www.cs.cmu.edu/afs/cs/academic/class/15213-f15/www/schedule.html
Unix Network Programming - source code: http://www.unpbook.com/

C++ language tutorial http://www.cplusplus.com/files/tutorial.pdf
C++ tutorial http://www.learncpp.com/
C++ reference: http://cppreference.com

MobaXterm: http://mobaxterm.mobatek.net/
Putty http://www.putty.org/
Filezilla https://filezilla-project.org/

Unix/Linux commands: https://kb.iu.edu/d/afsk
POSIX Thread Programming Tutorial. https://computing.llnl.gov/tutorials/pthreads/
Thread Programming
http://www.yolinux.com/TUTORIALS/LinuxTutorialPosixThreads.html
Python.org https://www.python.org/
Sqlite3 https://www.sqlite.org/

Technical Requirements:
In addition to a confident level of computer and Internet literacy, certain minimum technical requirements must be met to enable a successful learning experience. Please review the important technical requirements http://www.utdallas.edu/elearning/students/getting-started.html#techreqs on the Getting Started with eLearning webpage http://www.utdallas.edu/elearning/students/getting-started.html.

Course Access and Navigation
The course can be accessed using the UT Dallas NetID account at: https://elearning.utdallas.edu. Please see the course access and navigation http://www.utdallas.edu/elearning/students/getting-started.html#courseaccessandnav section of the site for more information.

To become familiar with the eLearning tool, please see the Student eLearning Tutorials http://www.utdallas.edu/elearning/students/eLearningTutorialsStudents.html.

UT Dallas provides eLearning technical support 24 hours a day/7 days a week. The eLearning Support Center http://www.utdallas.edu/elearninghelp services include a toll free telephone number for immediate assistance (1-866-588-3192), email request service, and an online chat service.

Communication
This course utilizes online tools for interaction and communication. Some external communication tools such as regular email and a web conferencing tool may also be used during the semester. For more details, please visit the eLearning Tutorials webpage http://www.utdallas.edu/elearning/students/eLearningTutorialsStudents.html for video demonstrations on eLearning tools.

Student emails and discussion board messages will be answered within 3 working days under normal circumstances.

Distance Learning Student Resources
Online students have access to resources including the McDermott Library, Academic Advising, The Office of Student AccessAbility, and many others. Please see the eLearning Current Students page http://www.utdallas.edu/elearning/students/cstudents.htm for details.

Server Unavailability or Other Technical Difficulties
The University is committed to providing a reliable learning management system to all users. However, in the event of any unexpected server outage or any unusual technical difficulty which prevents students from completing a time sensitive assessment activity, the instructor will provide an appropriate accommodation based on the situation. Students should immediately report any problems to the instructor and also contact the online eLearning Help Desk http://www.utdallas.edu/elearninghelp. The instructor and the eLearning Help Desk will work with the student to resolve any issues at the earliest possible time.

Assignments & Academic Calendar

Exams: There will be three exams during the course: two midterms and a final exam. The midterm exams will be limited to material covered during the immediate unit but the final exam is comprehensive. The dates of the three exams are listed on the class schedule below.

All exams will be at the Testing Center which requires seat reservation. Details will be announced on eLearning.

Assignments: There will be 4 assignments that will be assigned on eLearning. Assignments are due at midnight of the due date; the due dates of the assignments are listed in the class schedule below.

Weekly Activities: Students must carry out weekly activities which will be assigned on eLearning on Monday and due at midnight on Saturday each week. Completing all assigned activities for a week is required to be counted for class attendance (refer to the course attendance policy in the 'Course & Instructor Policies' sub-section below.)

Class Schedule

Week	Topics	Reading Assignment	Assessment & Weekly Activity	Due Date
0	Orientation & Prerequisite Form		Week 0 Activity (to sign and upload the completed prerequisite form PDF to elearning)	
1	Syllabus & Course Introduction Unix/Linux Introduction & Commands	Sobell Ch1-3 APUE 01	Week01 Activity - Install necessary software - Simple C programming See Week01 Activity folder on elearning for detail	
2	Unix, Linux Commands (Advanced) File Systems (Sobell Ch4) Editors (Sobell Ch6)	Sobell Ch4,6 APUE 03	Week02 Activity	
3	Shell concepts Bourne Again Shell – bash	Sobell Ch5, 8, APUE04	Week03 Activity	**Assignment 1**
4	Review of Unix basics and file system	Korn – Lecture 2 slides	Week04 Activity	
5	Process and filter	Korn – Lecture 3 slides APU 07-08	Week05 Activity	
6	Regular expression and text processing tools	Korn – Lecture 4 & 5 slides Sobell Ch14-15	Week06 Activity ***Exam I (Sep 30th)***	**Assignment 2**

7	Shell scripting	Korn – Lecture 6 slides	Week07 Activity	
8	Shell scripting – cont'd	Sobell Ch10	Week08 Activity	
9	Development tools	Korn – Lecture 8 & 13 slides	Week09 Activity	**Assignment 3**
10	Unix file I/O programming	APUE 03-04	Week11 Activity	
11	Standard I/O library	APUE 05	Week12 Activity ***Exam II (Nov 4th)***	
12	Process and signal programming	APUE07-08,10	Week13 Activity	
13	Thread programming	APUE 11-12	Week14 Activity	**Assignment 4**
14	No class			
15	Inter-process Communication (IPC), sockets programming Cloud computing	APUE 15-16	Week15 Activity	
16	Exam III		***Exam III (Dec 7th)***	

Grading Policy

The grade each student will earn from this class will be based on a weighted score calculated by using the following table:

Grades will be assigned according to the scale on the right:

Exam I	10%
Exam II	15%
Exam III	25%
Assignments	25%
Weekly activities	25%
Total	100%

Weighted Score	Grade
93.0 - 100	A
90.0 - 92.9	A-
87.0 - 89.9	B+
83.0 - 86.9	B
80.0 - 82.9	B-
77.0 - 79.9	C+
73.0 - 76.9	C
70.0 - 72.9	C-
67.0 - 69.9	D+
60.0 - 66.9	D
Below 60.0	F

Course & Instructor Policies

- **Attendance policy:** *missing **two** class weeks leads to **one letter grade drop**, missing **three** class weeks leads to **an F grade**.*
- *There will be no makeup exams under normal circumstances.*
- *No late homework or assignment will be accepted!*
- *I do not read e-Learning e-mails. Please use my UTD e-mail account above for any communications.*

Class Materials

The instructor may provide class materials that will be made available to all students registered for this class as they are intended to supplement the classroom experience. These materials may be downloaded during the course, however, these materials are for registered students' use only. Classroom materials may not be reproduced or shared with those not in class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Classroom Conduct Requirements Related to Public Health Measures

UT Dallas will follow the public health and safety guidelines put forth by the Centers for Disease Control and Prevention (CDC), the Texas Department of State Health Services (DSHS), and local public health agencies that are in effect at that time during the Fall 2021 semester to the extent allowed by state governance. Texas Governor Greg Abbott's Executive Order GA-38 prohibits us from mandating vaccines and face coverings for UT Dallas employees, students, and members of the public on campus. However, we strongly encourage all Comets to get vaccinated and wear face coverings as recommended by the CDC. Check the Comets United: Latest Updates webpage for the latest guidance on the University's public health measures. Comets are expected to carry out Student Safety protocols in adherence to the Comet Commitment. Unvaccinated Comets will be expected to complete the Required Daily Health Screening. Those students who do not comply will be referred to the Office of Community Standards and Conduct for disciplinary action under the Student Code of Conduct – UTSP5003.

Class Attendance

The University's attendance policy requirement is that individual faculty set their course attendance requirements. Regular and punctual class attendance is expected. Students who fail to attend class regularly are inviting scholastic difficulty. In some courses, instructors may have special attendance requirements; these should be made known to students during the first week of classes.

Class Participation

Regular class participation is expected. Students who fail to participate in class regularly are inviting scholastic difficulty. A portion of the grade for this course is directly tied to your participation in this class. It also includes engaging in group or other activities during class that solicit your feedback on homework assignments, readings, or materials covered in the lectures (and/or labs). Class participation is documented by faculty. Successful participation is defined as consistently adhering to University requirements, as presented in this syllabus. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Class Recordings

Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the Office of Student AccessAbility has approved the student to record the instruction, students are expressly prohibited from recording any part of this course. Recordings may not be published, reproduced, or shared with those not in the class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

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."

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.

These descriptions and timelines are subject to change at the discretion of the Instructor.