Syllabus COSC 2347.01 "C" with Linux
Spring 2018

Instructor: **David Burris, Ph.D., CCP, CSP**

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Course information is available via Blackboard

Location/Time: **8-8:50 MWF, AB1-206**

Office Hours: 10-11 MWF
10-11:00 TTH
others by appointment including 7:00 – 7:45 A.M.

I am frequently in my office. I may not always be able to stop what I am doing, but you are free to drop by any time you need help. Travel is required for my duties as university Articulation Coordinator. In addition, department and university meetings occasionally consume a lot of my time including office hours. Do not put off till tomorrow what you can accomplish today. If you need help with concepts or assignments see me as soon as the need develops.

Registration: Undergraduate:

Departmental Course Objective:
A first course in "C" and "C++" programming for individuals with a strong programming background. Use of the Linux/Unix environment is stressed. The first part of the course will concentrate on basic concepts such as control, make files, header files, file I/O, data types, structured types, scope, passing information between program units, recursion, strings, bit manipulation, and arrays. Special emphasis will be placed on address arithmetic and use of pointers. The last portion of the course will discuss the extensions provided for Object Oriented Programming in large team projects provided by C++.

The class emphasizes concepts which the student will implement in lab assignments. Additional department goals supported by this course include: a) developing a strong technical foundation in the computational sciences, b) an understanding and sensitivity towards professional ethics, c) appreciation for the need to pursue professional and related learning activities for life. Students are expected to: a) employ quantitative (mathematical) evaluations in seeking optimal problem solutions, b) maintain and increase their professional knowledge/skill sets, c) develop their ability to express

abstractions in the form of algorithms in the frame work of established software engineering practice and d) to extend the discipline through original cognitive processes. **Credit:** 3 hours.

Background: Students should have completed at least two programming courses with extensive confidence in their ability to solve problems by writing original code. It is helpful but not required to have some knowledge of assembly language, binary/hexadecimal arithmetic, and computer architecture. Sufficient background in these areas will be included as part of the lecture to allow for completion of lab assignments. It is strongly suggested the student should have completed a course in machine organization/assembly language or seek concurrent registration.

Instructor Specific Objectives: To prepare students for careers in systems programming (writing device drivers etc.), engineering/scientific computing, networking, hacking operating systems, digital forensics, and information assurance. Secondary emphasis will be placed on preparing students for membership in large team projects. Linux will be used extensively. Optimization for space and time are considered at the coding level and architectural levels. Defensive programming topics include: bounds checking, type checking, check digits, check sums, reasonableness checks, dual logic and majority voting, legal issues, professional certifications, limiting the visibility/extensibility of software. Students will learn to use development tools such as scripts, "make," pipes, creation of static, shared, and dynamic libraries. Additional software development tools will be covered as allowed by time. Some concurrent programming will be required.

Software Development, Open Office, and Course Notes: Welcome to COSC 2347 "C" with GNU/Linux. There is no required text for this course. All recommended study materials are either posted or freely available via the web.

No Microsoft products will be utilized in this course. Several versions of the GNU operating system better known as Linux (the name of the kernel) including Debian, Susse, Red Hat, Fedora, and Ubuntu may be downloaded and installed off the web at no cost. With the exception of some versions advertised as "minimal," I have yet to encounter a version of GNU Linux not suitable for use in the course. The compiler tool chain available with all versions will be used for software development and examples in class. The use of other UNIX versions is frequently approved on request.

Some of you are wed to Microsoft. You have several options.

1) Use of a "live CD." Many versions of GNU Linux may be run entirely from a CD drive including Ubuntu and Red Hat allowing you to retain your current host operating system as the only OS on the hard disk. You will need a CD/DVD/USB drive for the OS and USB drive to save files. You may not have access to the system hard disk. You must "boot" your system from the CD/DVD/USB drive.

2) Recent versions of Red Hat, Ubuntu and several other flavors of GNU Linux may be used as live CD's on a trial basis then as installation CD's to replace your existing operating system. In addition they offer the option of installing the Linux OS as a second OS on your hard disk. When you boot the computer, you get a menu asking which OS you desire to have started. If you have 15 gig of free hard disk space, this might be a good option.

3) Another option is to run the Linux OS on a virtual machine under an existing OS. Several free virtual machine downloads are available on the web. This is a reasonable approach!

4) Join the local ACM Computer Science Club. We have an agreement with the manufacture of VMware. Not only can you download a free copy of their primer product to run virtual operating systems but the software to create virtual operating systems**. I prefer to use this approach**!

5) Most book stores offer low cost books containing versions of Linux including installation/live CD's.

To install a new OS, live CD/USB, or create a virtual machine you typically require a bootable copy of the operating system. Operating system images may be purchased or downloaded off the web. I encourage you to download your own image regardless of the option you select. If you burn CD/DVD/USB images remember they must be burned in "disk image" (ISO - International Standards Organization) format to be bootable.

Next, all instructor supplied text and examples for this course are in Libre/Open Office format. I will not be using Microsoft products for new materials. Libre Office may be selected as an installation option at the time you install your OS or at a future time. Libre Office may also be installed at no cost on most Microsoft operating systems. Most "docx" file features are supported but I recommend Libre Office format for saving files. If you wish to work on files in both Libre Office and MS Word, I suggest the use of the "doc" format.

Absence Policy: Students are encouraged to attend all classes, but absences will not be used in computing the course grade. *A zero will be recorded for all work missed due to absence unless arrangements to complete missed work are made prior to the class that is missed.*

Tentative test dates: Wednesday February 14, Wednesday March 21, Wednesday April 18 and the comprehensive final.

Grading: Three to four equally weighted exams will be administered during the semester including the final exam. Extensive use of essay questions is made on exams. Exams will constitute 50% of the course grade. The final exam will be comprehensive. In the event a student scores higher on the final exam than one of the regular tests, the lowest regular test grade, will be dropped and the grade on the final

exam doubled, provided that **all** other assignments have been completed with a grade of 70 or higher. Under no circumstances will a course grade higher than a "C" be awarded to a student not making at least a "C" on every lab assignment. The scale of A = 90-100, B = 80-89, C = 70-79, D = 60-69, F= below 60 will be used.

Assignments are due at the start of class. Once class starts, anything turned in will be graded as "late" work. Assignments given to the departmental secretaries, placed in my mailbox, etc., will not be graded. All work must be given to me personally. Copies of graded test and labs may be retained to meet department accreditation requirements.

MOST OF MY LABS APPEAR ONLINE WITH PROFESSIONAL CODE IN PUBLIC AND PRIVATE RESPOSITORIES SUCH AS "GITHUB.COM." The minimum penalty for use of these resources is an "F" (zero) for the lab. The maximum penalty is a request to the Dean of students to drop the student(s) from the university. You are encouraged to help each other with concepts, and coding/debugging questions. Labs must however be done individually. Never give another person an electronic or hard copy of your work. I have little patience for those who "enable" others to be dishonest.

Text: There is no single text covering all material in the course. Any standard text with extensive coverage of the "C" language will suffice. Benefit can frequently be derived by looking at more than one text. "C How to Program" by Deitel, Prentice Hall, is a reasonably good text. An excellent book on application programming is "GNU/Linux Application Programming" by M. Tim Jones, published by Thomson, Charles River Media Programming Series, ISBN 1-58450-371-8 (obtain the most recent edition). This text covers many of the Linux concepts developed in the course.

You will learn a lot by reading multiple texts carefully from cover to cover several times during the semester. If you are unwilling to spend time reading the text, please do not waste the money. You will only be unhappy with yourself, me, or both.

No text is required for this course. I will place class notes on Blackboard as they are needed.

Class Notes and Software:

Students are welcome to make a copy of the class notes in facilities operated by university Computer Services. Notes may be bound for use in class. The instructor retains all copyright privileges to instructional materials. Students registered for the class are authorized to make a copy of instructional material for their own use to complete the course. Instructional materials may not be distributed in part or whole to others without the expressed written approval of the instructor.

All software and programming examples used in class appear on Blackboard. They are also located at T:\CSC\DSB\COSC2347 and its subdirectories. Extensive examples of useful "C" and "C++" code not directly related to the class may be found at T:\CSC\DSB\CPP.

University Policy Statements:

Academic Integrity: All students are expected to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain honesty and integrity in the academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. The University and its official representatives may initiate disciplinary proceedings against a student accused of any form of academic dishonesty including but not limited to, cheating on an examination or other academic work which is to be submitted, plagiarism, materials copied or purchased from a tutor, collusion and the abuse of resource materials.

Assignments made form one semester to the next are similar of necessity. Assignments are developed with the goal of providing a student with the opportunity to develop the desired level of intellectual achievement while not over burdening the student with excessive work. The use of work done by others including students (past or present) or tutors (paid or unpaid) will be construed as cheating. "Any" verifiable instance of cheating will normally result in a grade of "F" for the course for all individuals involved. Students should not have in their possession labs or tests belonging to other students from the current or previous semesters.

Students from previous semesters providing materials to students in following semesters will be subject to all disciplinary actions provided by the university.

Classroom Rules of Conduct: University policy states students will refrain from behavior in the classroom that intentionally or unintentionally disrupts the learning process and, thus, impedes the mission of the University. Cellular telephones and pagers and other disruptive devices must be turned off prior to the start of class. Students are prohibited from eating in class, using tobacco products, making offensive remarks, reading newspapers, sleeping, talking at inappropriate times, wearing inappropriate clothing, or engaging in any other form of distraction. Inappropriate behavior in the classroom shall result in a directive to leave class. Students who are especially disruptive will be subject to removal by University Police and / or reported to the Dean of Students for disciplinary action in accordance with university policy.

Visitors in the Classroom:

Only registered students may attend class. Exceptions can be made on a case-by-case basis by the professor. In all cases, visitors must not present a disruption to the class by their attendance. Students wishing to audit a class must apply to do so through the Registrar's Office.

STUDENTS WITH DISABILITIES POLICY:

It is the policy of Sam Houston State University that individuals otherwise qualified shall not be excluded, solely by reason of their disability, from participation in any academic program of the university. Further, they shall not be denied the benefits of these programs nor shall they be

subjected to discrimination. Students with disabilities that might affect their academic performance should register with the Office of Services for Students with Disabilities located in the Lee Drain Annex (telephone 936-294-3512, TDD 936-294-3786, and e-mail disability@shsu.edu). They should then make arrangements with their individual instructors so that appropriate strategies can be considered and helpful procedures can be developed to ensure that participation and achievement opportunities are not impaired.

SHSU adheres to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations for students with disabilities. If you have a disability that may affect adversely your work in this class, then I encourage you to register with the SHSU Services for Students with Disabilities and to talk with me about how I can best help you. All disclosures of disabilities will be kept strictly confidential. NOTE: No accommodation can be made until you register with the Services for Students with Disabilities.

Religious Holidays:

Section 51.911(b) of the Texas Education Code requires that an institution of higher education excuse a student from attending classes or other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. Section 51.911 (a) (2) defines a religious holy day as: "a holy day observed by a religion whose places of worship are exempt from property taxation under Section 11.20…." A student whose absence is excused under this subsection may not be penalized for that absence and shall be allowed to take an examination or complete an assignment from which the student is excused within a reasonable time after the absence.

University policy 861001 provides the procedures to be followed by the student and instructor. A student desiring to absent himself/herself from a scheduled class in order to observe (a) religious holy day(s) shall present to each instructor involved a written statement concerning the religious holy day(s). The instructor will complete a form notifying the student of a reasonable timeframe in which the missed assignments and/or examinations are to be completed. For a complete listing of the university policy, see the university website.

Updated: December 12, 2017