Course Syllabus

COSC 3319.01 Data Structures

Spring 2018, 3 Credit Hours

Location / Time AB1-204, 8-9:20 TTH

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

Office: **AB1-212C**

Phone / email: **(936)294-1568, csc_dsb@shsu.edu**
Course information is available via Blackboard

Office Hours: Monday/Wednesday/Friday: 10:00-11:00
Tuesday/Thursday 10:00-11:00
others by appointment including 7:00 – 7:45 A.M.

I spend a lot of the time on campus. 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. I frequently answer questions online, especially where you have a choice or that require a decision. If you need something explained, see me at the office.

Departmental Course Objective: Introductory treatment of such topics as orthogonal lists, strings, arrays, linked lists, multilinked structures, indexed files / direct files, generalized data management and database management systems. Students should not take this course unless they are confident of their ability to write computer programs. 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 for 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. Prerequisites: COSC 1437 and confidence in your ability to write programs. Credit 3 hours.

Instructor Specific Objectives: Sequential and link allocated memory implementations of stacks, queues, and deques. One dimensional, multidimensional, and triangular matrix will be implemented using contiguous and linked memory allocation. Appropriate algorithms to efficiently search sequentially allocated memory where instances an item may only appear at most one time, may appear more than one time, and where the items is not expected to appear are investigated. Similar algorithms for link allocated data structures. Additional algorithms including self-organizing list, binary searches, hashing are studied. Theoretical and practical determination of appropriate search algorithms for both internal and external memory is studied. Internal / external memory sorting including topological sorting, sort by selection, bubble sort, radix sorting, and additional algorithms will be studied. A detailed discussion is held with respect to general considerations affecting the efficiency of sorting algorithms. Application of binary trees, m-ary trees, and forest (both recursive and iterate algorithms) are applied to business, scientific, engineering, and artificial intelligence applications. Additional commercially applicable algorithms such as locating misspelled keys are covered. Multi-list and inverted list in both main memory and auxiliary memory are considered with respect to search algorithms and implementing commercial database products.

Quantitative techniques for estimating algorithm performance are required. Use of “abstract data types” is emphasized for implementation. Students will develop a greatly expanded knowledge of the programming language or languages selected for implementation.

Text: No text is required for this course. All material utilized in class is available on Blackboard. Students are urged to make a copy of the class notes in facilities operated by university Computer Services. Notes may be bound for use in class or accessed online. 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.

Most book stores carry an excellent selection of texts on data structures. The usefulness of any text is directly related to the time you spend reading and studying the material. Do not purchase a text unless you plan to utilize the text.

Required Supplies: None.

Option Texts / Supplies: It is convenient but not necessary to have your own computer and software. Access to free, inexpensive, and commercial suggested software is available on Blackboard.

Attendance 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.* The university does request we report when students stop attending class.

Assignments: All assignments are posted on Blackboard. It is the student's responsibility to check Blackboard sufficiently often to obtain class assignments. New course materials are also made available to students via Blackboard. Assignments and other notifications are frequently emailed via Blackboard to "university email accounts" of students officially registered for the course. Private email accounts will not be utilized for course communications.

MOST OF MY LABS APPEAR ONLINE WITH PROFESSIONAL CODE IN PUBLIC AND PRIVATE RESPOSITORIES SUCH AS "GITHUB.COM." The typical penalty is course failure! The minimum penalty for use of these resources is an "F" (zero) for the lab. 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. Typically one or more individuals will fail every semester for making code available to others.**

Tentative test dates:

TTH: Thursday February 15, Thursday March 22, Thursday April 19 and the comprehensive final exam.

Grading: Three to four equally weighted exams will be administered during the semester including the final exam. Exams will constitute 50% of the course grade. The final exam will be comprehensive. Other assignments will constitute the remaining 50% of the grade. 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 on each. To attain a course grade higher than "C" the student must complete each lab assignment with a grade of "C" or higher regardless of their test average. The scale of A = 90-100, B = 80-89, C = 70-79, D = 60-69, F= below 60 will be used.

Extensive use of essay questions and writing original algorithms is made on exams. Students are expected to be able to express solutions in a programming language appropriate to the proposed problem. Quantitative evaluation of algorithm performance will be utilized in class and on exams.

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. As your employer I desire and expect your best effort. Copies of graded test and labs may be retained to meet department accreditation requirements.

Academic Integrity: All students are expected to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain complete 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, 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 other students past or present 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: Permission to visit is at the discretion of the instructor. In general, individual wishing to visit a class must present a current, official SHSU identification card to be permitted in the classroom. They must not present a disruption to the class by their attendance. Deviation for these guidelines is at the sole discretion of the instructor.

Religious Holidays: Students wishing exception for religious holidays must meet all university guidelines and deadlines listed in the catalog, calendar, and university policy at http://www.shsu.edu. In general all test and work to be missed must be completed prior to the absence.

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.

A complete listing of the university student policies is available on the university home page.

Updated December 12, 2017