CSCI532.01W
Algorithm Design

COURSE SYLLABUS: Summer II, 2024

INSTRUCTOR INFORMATION

Instructor: (Name & Title) Dr. Abdullah N. Arslan

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Preferred Form of Communication: e-mail
Communication Response Time: 24 hrs

COURSE INFORMATION

Materials – Textbooks, Readings, Supplementary Readings

Textbook(s) Required

"Introduction to Algorithms", second edition by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, Second (or later) Edition, Mc Graw-Hill

This is an online course. Students are expected to attend the lectures to learn, take notes, and follow the announcements made in the classroom such as assignment deadlines. The professor will try to make supplementary information for the course available in D2L Brightspace. These include class notes, assignments, PowerPoint slides, class announcements, the course syllabus, test dates, etc. The professor will announce in class when such information becomes available electronically. It is the student's responsibility to follow these announcements on-line.

Software Required
Students can use C, C++, or Java. Visual Studio.net or Dev C++ available in JOUR 101/102

Optional Texts and/or Materials

Course Description
Algorithm Design. Three semester hours. This course provides an introduction to the design analysis of algorithms. Topics include correctness of algorithms, asymptotic notation, time complexity of algorithms, and NP-completeness. Several algorithm design techniques will be discussed in detail including divide and conquer algorithms, dynamic programming algorithms and greedy algorithms. Algorithms based on these techniques will be studied for solving a wide variety of problems in networks, graph theory, optimization, sorting, string processing, mathematical applications, and other areas. Prerequisite: CSCI 520 (at least 'B' must be earned).

The main objective of this course is to teach students how to analyze practical problems in order to identify and develop best algorithms (in terms of time complexity and memory usage) for their solutions.

Student Learning Outcomes
1) To teach students how to analyze algorithms in order to determine their calculation complexity in the terms of Big Oh, Big theta and Omega. Recursions.

2) To teach sorting algorithms (such as mergesort and quicksort) and their applications.

3) Probabilistic Analysis and Randomized algorithms for sample problems from the following list (not limited to, and not necessarily including all): CS- Hiring, Longest Streaks, Bins and Balls problem, the Birthday paradox, and randomized quicksort.

4) Binary search trees and optimal binary search trees, and their applications.

5) Dynamic programming algorithms for problems such as line scheduling, matrix chain multiplication, longest common subsequence, and their practical applications.

6) Greedy algorithms for problems such as the activity selection problem and its application to resource planning.

7) If time permits, Graph Algorithms such as Minimum Spanning Tree algorithms and Dijkstra's shortest path algorithm.

COURSE REQUIREMENTS

Minimal Technical Skills Needed

Students must know using the learning management system. They need to know how to program in at least one programming language.

Instructional Methods

The instructor will cover the topics in the lectures. He will prepare relevant programming assignments, and practice questions. Answers to quizzes and exams, and approaches to assignments will be discussed in class.

Student Responsibilities or Tips for Success in the Course

Students must regularly log into the course website, and participate in discussions in lectures. They need to deliver the assignments on time.

GRADING

Final grades in this course will be based on the following scale:

A= 90%-100%
B= 80%-89%
C= 70%-79%
D= 60%-69%
F = 59% or Below

Final score will be out of 100, and the above percentages will be applied to student's total score to determine the letter grade.

Assessments

Two midterm exams	35%
Programming Assignments	15%
Quizzes	20%
Comprehensive final test	30%

Quizzes, programming assignments, and tests will include questions on each of the student learning outcome listed earlier.

The professor reserves the rights to reward students for continuous hard work or for an exceptional novel scientific work (as judged by the instructor) relevant to the topics covered.

TECHNOLOGY REQUIREMENTS

LMS

All course sections offered by Texas A&M University-Commerce have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are technical requirements

LMS Requirements:
https://community.brightspace.com/s/article/Brightspace-Platform-Requirements

LMS Browser Support:
https://documentation.brightspace.com/EN/brightspace/requirements/all/browser_support.htm

YouSeeU Virtual Classroom Requirements:
https://support.youseeu.com/hc/en-us/articles/115007031107-Basic-System-Requirements

ACCESS AND NAVIGATION

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@tamuc.edu**.**

Note: Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a TAMUC campus open computer lab, etc.

COMMUNICATION AND SUPPORT

If you have any questions or are having difficulties with the course material, please contact your Instructor.

Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found here:

https://community.brightspace.com/support/s/contactsupport

Interaction with Instructor Statement

The instructor will respond to your questions within 24 hrs unless there are exception situations such as sickness.

COURSE AND UNIVERSITY PROCEDURES/POLICIES

A&M-Commerce requires the use of face-coverings in all instructional and research classrooms/laboratories. Exceptions may be made by faculty where warranted. Faculty have management over their classrooms. Students not using face-coverings can be required to leave class. Repetitive refusal to comply can be reported to the Office of Students' Rights and Responsibilities as a violation of the student Code of Conduct.

Students should not attend class when ill or after exposure to anyone with a communicable illness. Communicate such instances directly with your instructor. Faculty will work to support the student getting access to missed content or completing missed assignments.

This course will be online this semester.

Course Specific Procedures/Policies

Quizzes: are to be solved online independently during the given time. Makeup quizzes will not be given. However, the lowest quiz grade will be dropped. Any class material missed by the student is the student's responsibility to acquire.

Tests: The two in-class tests will be given roughly at regular intervals. Students will be informed of the test dates around a week in advance. The test will take no more than one class period and will be given at the scheduled times only. No opportunity will be given to take the test at earlier or later times except in extreme cases as judged by the instructor.

Makeup: Except extreme cases (as judged by the instructor), no individual makeup test will be permitted**.**

Programming Assignments: Two programming assignments will be given. The programs must be students' own work. The student is supposed to explain his/her work and to answer all questions about the work.

Attendance:

From the Students' Handbook: *"Students are expected to be present for all class meetings of any course for which they are enrolled. Per University Procedure A13.02, effective September 1, 1996, students are responsible for learning about and complying with the attendance policy stated in the catalog, Student's Guidebook, and/or faculty syllabus. It is the prerogative of the faculty to drop students from courses in which they have accrued excessive absences as defined in the course syllabus."*

Syllabus Change Policy

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

Student Conduct

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The Code of Student Conduct is described in detail in the Student Guidebook.
http://www.tamuc.edu/Admissions/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum:
https://www.britannica.com/topic/netiquette

TAMUC Attendance

For more information about the attendance policy please visit the Attendance webpage and Procedure 13.99.99.R0.01.
http://www.tamuc.edu/admissions/registrar/generalInformation/attendance.aspx

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/academic/13.99.99.R0.01.pdf

Academic Integrity

Students at Texas A&M University-Commerce are expected to maintain high standards of integrity and honesty in all of their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

Undergraduate Academic Dishonesty 13.99.99.R0.03

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf

Graduate Student Academic Dishonesty 13.99.99.R0.10

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/graduate/13.99.99.R0.10GraduateStudentAcademicDishonesty.pdf

Students with Disabilities-- ADA Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services
Texas A&M University-Commerce
Gee Library- Room 162
Phone (903) 886-5150 or (903) 886-5835
Fax (903) 468-8148
Email: studentdisabilityservices@tamuc.edu
Website: Office of Student Disability Resources and Services
http://www.tamuc.edu/campusLife/campusServices/studentDisabilityResourcesAndServices/

Nondiscrimination Notice

Texas A&M University-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the

basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

Campus Concealed Carry Statement

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University-Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations.

For a list of locations, please refer to the Carrying Concealed Handguns On Campus document and/or consult your event organizer.

Web url:
http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all A&M-Commerce campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

From the textbook, Chapters 1, 2, 3, 4, 5, 12, 15 (.1, .2, .4), 16.1, 16.2, and 24.3 will be covered. If time permits some additional selected topics may also be covered.

There could be some modifications to the schedule.

Texas A&M University-Commerce acknowledges that there are legitimate uses of Artificial Intelligence, ChatBots, or other software that has the capacity to generate text, or suggest replacements for text beyond individual words, as determined by the instructor of the course.

Any use of such software must be documented. Any undocumented use of such software constitutes an instance of academic dishonesty (plagiarism).

Individual instructors may disallow entirely the use of such software for individual assignments or for the entire course. Students should be aware of such requirements and follow their instructors' guidelines. If no instructions are provided the student should assume that the use of such software is disallowed.

In any case, students are fully responsible for the content of any assignment they submit, regardless of whether they used an AI, in any way. This specifically includes cases in which the AI plagiarized another text or misrepresented sources.

13.99.99.R0.03 Undergraduate Academic Dishonesty
https://inside.tamuc.edu/aboutus/policiesproceduresstandardsstatements/rulesprocedures/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf

13.99.99.R0.10 Graduate Student Academic Dishonesty
https://inside.tamuc.edu/aboutus/policiesproceduresstandardsstatements/rulesprocedures/13students/graduate/13.99.99.R0.10.pdf

COURSE OUTLINE / CALENDAR

TOPICS AND ACTIVITIES BY WEEKS

WEEK	TOPIC
1	Time complexity analysis, algorithm correctness, recursion, recurrences, divide and conquer long integer and matrix multiplication algorithms
2	Sorting algorithms, probabilistic analysis of algorithms, binary search trees and review, Practice Questions, Exam 1
3	Dynamic programming algorithms. Programming Assignment is posted, Practice Questions, greedy algorithms, Exam 2
4	Programming Assignment is due; Practice Questions, other graph algorithms, review, Final Exam

From the textbook, Chapters 1, 2, 3, 4, 5, 12, 15 (.1, .2, .4), 16.1, 16.2, and 24.3 will be covered. If time permits some additional selected topics may also be covered.

The *syllabus/schedule are subject to change.*