CS 3352: Theory of Algorithms

Fall 2021

Course syllabus

Class meetings section 010: MWF 8:00–8:50 in RAS 105

Instructor

Rob LeGrand
e-mail: `rlegrand@angelo.edu`
webpage: `www.cs.angelo.edu/~rlegrand/`
office phone: 325-486-5422
office location: MCS 205I
office hours: online MTWRF 2:00–4:00 and by appointment

Textbook Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein. *Introduction to Algorithms*. 3rd edition. MIT Press, 2009. ISBN: 978-0-262-03384-8. Available in the ASU bookstore.

Description An in-depth study of computer algorithms, including those for hash tables, trees and graphs; analysis of time and space requirements of algorithms; NP-completeness and undecidability of problems.

Prerequisites CS 2336 (Data Structures and Algorithms) is a prerequisite and MATH 2305 (Discrete Mathematics I) is a co-requisite for this course. Please see me if you haven't taken CS 2336 or if you're unsure about your proficiency in data structures and/or discrete math.

Grading breakdown

50% assignments/quizzes/homework

50% exams (three or four, including final)

Student learning outcomes After successful completion of this course, students will be able to

- demonstrate proficiency in analyzing time and space complexity of iterative and recursive algorithms.
- demonstrate proficiency in programming algorithms for hash tables, trees and graphs.
- demonstrate an understanding of the theory of NP-completeness.

Class format

This class will usually have a lecture/discussion format, with homework and programming assignments done primarily outside of class. It is very important that you do all assigned reading before class and come with relevant questions. There may be in-class quizzes over reading and lecture material.

I will take attendance, and you will need to sit in the same place all semester. Class attendance is strongly encouraged. You have a duty to inform me as soon as you know that you'll have to miss a class.

You will generally be asked to work individually on assignments. Discussion and giving and receiving help are generally encouraged when working on assignments, but all work you turn in must be your own; anything you turn in you must understand thoroughly and be prepared to explain in detail. Whenever you work with anyone but me (including tutors) in any way, you *must* write fully detailed comments in your code describing the help: *who* helped, *how* they helped on *which* part(s), etc. Failure to do so is considered taking credit for work not done and thus cheating. I will be glad to help you on assignments and concepts when you need it. Exams must be completed *entirely* independently. Many exam questions will be similar to questions you will see on the Major Field Test.

Blackboard (`angelo.blackboard.com`) will be used to keep track of grades and assignments. You should check Blackboard and your ASU e-mail at least once a day to make sure you're not missing anything. In particular, your ASU e-mail is the only reliable way I have of contacting you outside of class, so please don't neglect it.

Safety

I strongly recommend and encourage wearing a mask covering both mouth and nose before, during and after class meetings. I also recommend keeping as much distance from others as is reasonably possible.

For safety reasons, I will hold office hours online using Blackboard Collaborate. Please take advantage of face-to-face class meetings to ask questions and get help, but when you need help outside of class just get in touch and I'll do what I can to help.

Computer requirements

You may use PCs in the computer labs, but I recommend that you have your own Windows 10 computer ready to use when you can't get to a lab. You may need to download and install free software, such as the Respondus LockDown Browser. It is your responsibility to have and use a reliable Internet connection; for best results, use an Ethernet cable to connect to your Internet source instead of relying on Wi-Fi. You will need a webcam to use Blackboard Collaborate for virtual office hours.

Semester schedule

This schedule of topics should be considered approximate and tentative.

week of	topic
August 23rd	asymptotic analysis
August 30th	asymptotic analysis
September 8th	recurrence relations
September 13th	recurrence relations
September 20th	sorting
September 27th	hash tables
October 4th	hash tables
October 11th	binary search trees
October 18th	binary search trees
October 25th	graph algorithms
November 1st	graph algorithms
November 8th	graph algorithms
November 15th	NP-completeness
November 22nd	NP-completeness
November 29th	approximation algorithms

Final exam

The final exam for this course is scheduled for Monday, December 6th, 8:00–10:00.

Academic honesty

Angelo State University expects its students to maintain complete honesty and integrity in their academic pursuits. By remaining enrolled in this course you agree not to commit academic misconduct as defined in section I.B.1 of the Student Handbook, available at `www.angelo.edu/student-handbook`.

Important university policies

- You must contact Student Disability Services in order to request and to implement academic accommodations.
- For ASU's policy on absences due to religious holy days, see OP 10.19 at `www.angelo.edu/opmanual`.
- I am obligated to report any knowledge of sexual misconduct to the Title IX office; see `www.angelo.edu/services/title-ix` for more.

Modifications

This syllabus, including grade evaluation and course schedule, is subject to modification. In particular, the COVID-19 pandemic may require significant changes in course delivery and content on potentially short notice.