University of North Texas
Department of Computer Science and Engineering

CSCE 5150 – Analysis of Computer Algorithms

Session: Spring/2022

Classes:

5150-001 (14236) - Fr 9:30AM - 12:20PM - NTDP B140
5150-003 (15118) - Tu 4:00PM - 6:50PM - LIFE A204

Instructor:
Dr. Moawia Eldow
Office: E250E
Tel: TBA
Email: moawia.eldow@unt.edu
Office hours: MoWe 12pm – 2pm

TAs/Graders:

5150-001 (14236):

Name: Sarika Miryala (TA)
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Office: TBA
Office hours: Thursday 3:00 PM to 4:30 PM

Name: Akhil Kailasa (Grader)
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Office hours: 3:00 to 5:00 PM

5150-003 (15118):

Name: Sarika Miryala (TA)
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Office hours: Thursday 3:00 PM to 4:30 PM

Name: Naga Praneetha Chadalavada (Grader)
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Office & Office hours: TBA

Description:

The study of efficient algorithms for various computational problems. Topics include advanced techniques of algorithm design: divide-and-conquer, the greedy method, dynamic programming, graph algorithms, and selected advanced topics. Other topics include NP-Completeness theory, including approximation algorithms and lower bound theory.

Course Objectives:

By the end of this course, students will be able to:

1. know the fundamentals of computer algorithms.
2. know how to analyze a computer algorithm.
3. know how to frame a problem and specify its solution with an appropriate algorithm.
4. have a good understanding of computer programming, data structures, and computer algorithms.
5. understand the key ideas behind divide and conquer, greedy algorithm, dynamic programming, and graph algorithms.
6. understand the theories behind NP-Completeness.

Prerequisites:

Programming with one of the high-level languages such as C, C++, or Java; Introductory courses on data structures and algorithm.

Textbook:

Introduction to Algorithms, by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stien, MIT Press, **Third Edition**.

Grades and grading policy:

Homework Assignments	**30%**
Programming Assignments	**30%**
Midterm Exam	**20%**
Final Exam	**20%**

The letter grade will be assigned based on the following scale:

Grade	5150
A	90 and Above
B	[80-90)
C	[70-80)
D	[60-70)
F	Below 60

Homework Assignments:

Written individual homework assignments/exercises ***will be due at 11:59 p.m. on Fridays.*** Assignments must be turned in using the dropbox on canvas.

Programming Assignments:

Programs may be written in any language as long as the TA/Grader and the instructor are able to build and execute from source code, and ***will be due at 11:59 p.m. on Fridays***. If in doubt, contact the instructor to verify that the programming environment is acceptable. Instructions will be provided in Canvas. Programs must be turned in using the dropbox on canvas.

Exams:

There will be one midterm exam during the semester at the normal lecture time, which will cover the first half of the class topics. There will also be a final exam during finals week, which will cover the second half of the class topics.

Late Submission Policy:

Assignments may be turned in late, but not more than two weeks. All the late submissions **may lose a percentage of their graded point values** according to the following schedule:

On time : **0%**
1-3 days : **10%**
4-7 days : **20%**
8-14 days : **40%**
> 14 days : **100%**

Announcements

Stay tuned and make sure to check Canvas frequently. Important announcements will be posted there.

Academic Policies

No cheating or plagiarism is allowed in assignments and exams. Academic dishonesty will result in a final course *grade of "F"*. "Sharing/reuse" of solutions to assignment problems is strictly prohibited. All work turned in with your name on it must be your own work.

Other Policies:

Students should refer to any other polices from university, college and department.

CSCE 5150 - Course Outline (*Tentative Schedule*):

Week	**Reading chapters and Topics**	**Homework (HW) & Programing Assignments (PA) – (due date)**
Jan 17-21	Overview of Class Ch1 & Ch2 – Algorithms in Computing & Getting started with Algorithms	
Jan 24-28	Ch3 – Growth of Functions (Revisited)	**HW1 (02/04/2022)**
Jan 31-Feb 4	Ch4 – Divide and Conquer	
Feb 7-11	Ch4 – Divide and Conquer (cont.)	**HW2 (02/18/2022), PA1 (02/18/2022)**
Feb 14-18	Ch15 – Dynamic Programming	
Feb 21-25	Ch15 – Dynamic Programming (cont.)	**HW3 (03/04/2022), PA2 (03/04/2022)**
Feb 28 -Mar 4	Review & Selected Advanced Topics	
Mar 7-11	**Mid-Term Exam** (03/08/2022 Tu class 03/11/2022 Fri class)	
Mar 14-18	**Spring Break (*No classes*)**	
Mar 21-25	Ch16 – Greedy Algorithms	**HW4 (04/01/2022), PA3 (04/01/2022)**
Mar 28-April 1	Ch16 - Greedy Algorithms (cont.) Ch22 – Graph Algorithms	
April 4-8	Ch23, 24 – Graph Algorithms (cont.)	**HW5 (04/15/2022), PA4 (04/15/2022)**
April 11-15	Ch25 – Graph Algorithms (cont.)	
April 18-22	Ch34 - NP-Completeness	**HW6 (04/29/2022)**
April 25-29	Selected Advanced Topics	
May 2-6	Review Week	
May 9-13	**Final Exam (*TBA*)**	