CS 477-677 Analysis of Algorithms
FALL 2019

Course Information

Instructor Information:

Instructor: Monica Nicolescu
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Office Hours: Tuesday 10am-noon, Thursday 9:30-10:30am, and by request

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Office Hours: Monday, Wednesday: 2:30 - 3:30pm

Course Description:

Analysis and design of algorithms on sequences, sets, graphs and trees. Geometric, algebraic and numeric algorithms, FFTs, reductions. Parallel algorithms.

Course Pre/Co-requisites:

CS 302 with a "C" or better; CS 365 or EE 291.

Required texts, course materials:

Introduction to Algorithms, 3rd Edition, by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, 2009.

Unique class procedures /structures:

The design and analysis of algorithms is the core subject matter of Computer Science. Given a problem, we want to (a) find an algorithm to solve the problem, (b) prove that the algorithm solves the problem correctly, and (c) prove that we cannot solve the problem any faster. Designing an algorithm for a computational problem involves knowledge of the problem domain, a thorough knowledge of the data structures that are available and suitable, and no small measure of creativity. This course concentrates on the above problems, studying useful algorithmic design techniques, and methods for analyzing algorithms.

Student Learning Outcomes:

Graduate SLOs

Students will have:

(a) an ability to apply engineering and computer science research and theory to advance the art, science, and practice of the discipline

Undergraduate SLOs

Students will have an ability to:

SLO1	Identify, formulate, analyze, and solve complex computing or engineering problems by applying principles of computing, engineering, science, and mathematics.
SLO2	Design, implement, and evaluate a computing or engineering solution to meet a given set of requirements, with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

Course Requirements:

Homework assignments: There will be a number of homework assignments, some of which will include programming. The homeworks and their due dates will be posted on the course web page. Homeworks are due on the specified date at the beginning of the class.

Exams: There will be one midterm exam and one final exam. Both exams will be closed books, closed notes.

Grading Criteria, Scale, and Standards:

Grading structure: The final score will be computed as follows:

Homeworks:	40%
Midterm exam:	25%
Final exam:	30%
Attendance and class participation:	5%

Letter grades: The letter grade will be computed according to the following table. Some upward adjustment may occur, but do not count on it.

88-100:	A-, A
75-87:	B-, B, B+
62-74:	C-, C, C+
50-61:	D-, D, D+
< 50:	F

Late Work or Make-up Exams Policies:

- Each late homework will incur a 10% penalty for each day of delay, but no homework may be submitted later than 3 days after the deadline.
- Permissions to take exams on other dates than scheduled will not be given, except for extreme medical/personal emergencies.

Topics Outline:

Exam schedule:

- The mid-term exam will tentatively be scheduled for October 16 during class time.
- The final exam will be on December 13 from 12:10-2:10pm.

The course will cover the following topics:

- Introduction/Mathematical Foundations (Chapters 1, 3, Appendix A)
- Recurrences (Chapter 4)
- Sorting Algorithms (Chapters 2, 8)
- Randomized Algorithms (Chapters 5, 7, 9)
- Data Structures (Chapters 6, 11, 12, 13, 14)
- Greedy Algorithms (Chapter 16)
- Dynamic Programming (Chapter 15)
- Graph Algorithms (Appendix B4, Chapters 22, 23, 24, 25)
- Selected Topics (Chapters 28, 30, 31, 34, 35)

University Policies

Statement on Academic Dishonesty:

The University Academic Standards Policy defines academic dishonesty, and mandates specific sanctions for violations. See the University Academic Standards policy: UAM 6,502.

Statement of Disability Services:

Any student with a disability needing academic adjustments or accommodations is requested to speak with me or the Disability Resource Center (Pennington Achievement Center Suite 230) as soon as possible to arrange for appropriate accommodations.

University Math Center (UMC)

The University Math Center (UMC) is focused on helping students with mathematical and statistical concepts. While mathematics is used extensively in engineering, the UMC does not have the resources to help students with engineering courses. Engineering students are encouraged to use the UMC for help in their math classes, and they are welcome to use its computer lab and study area any time – regardless of course. However, UMC tutors cannot answer questions regarding engineering courses.

Statement on Audio and Video Recording:

Surreptitious or covert video-taping of class or unauthorized audio recording of class is prohibited by law and by Board of Regents policy. This class may be videotaped or audio recorded only with the written permission of the instructor. In order to accommodate students with disabilities, some students may have been given permission to record class lectures and discussions. Therefore, students should understand that their comments during class may be recorded.

The University of Nevada, Reno is committed to providing a safe learning and work environment for all. If you believe you have experienced discrimination, sexual harassment, sexual assault, domestic/dating violence, or stalking, whether on or off campus, or need information related to immigration concerns, please contact the University's Equal Opportunity & Title IX office at 775-784-1547. Resources and interim measures are available to assist you. For more information, please visit the Equal Opportunity and Title IX page.

Statement for Academic Success Services:

Your student fees cover usage of the Math Center (775) 784-4433, Tutoring Center (775) 784-6801, and University Writing Center (775) 784-6030. These centers support your classroom learning; it is your responsibility to take advantage of their services. Keep in mind that seeking help outside of class is the sign of a responsible and successful student.