Computer Science Department

COMP.4040 (Section 011) Analysis of Algorithm

3 credits

Summer 2019 Syllabus

General Information

Instructor	Dr. Sirong Lin
Office	Dandeneau 311
Email	sirong_lin@uml.edu
Class Time/ Location	MWR 10:30 am – 12:50 pm, Falmouth Hall 313 - NC
Tentative Office Hours	MWR: 12:50 pm – 1:20 pm and by appointment

Contact the Instructor

- Office hours: the best way to contact the professor is to visit the professor's office hours.
- Piazza website: please post questions related to assignments and class on Piazza whenever possible, so others can benefit too. Read the rules further below.
- Email: If you need to send an email to discuss private issues (e.g., your grades), please keep the message brief and put "[4040Algorithm]" in the email title. Otherwise, your email may not be read and replied in a timely manner. Please don't expect the emails will be read as soon as you send them out.

Required Textbook

- *Introduction to Algorithms* by T.H. Cormen, C.E. Leiserson, R.L. Rivest, MIT Press, 3rd edition, 2009. ISBN 978-0-262-03384-8.

Supplementary Textbook / Materials

- See Blackboard

Course Description

- This is a required course for Computer Science majors. It builds on the introduction to data types and data structures that students receive in Computing II (COMP.1020).
- This course meets the Essential Learning Outcome of Critical Thinking and Problem Solving as defined under the Core Curriculum requirements. As such, it will reinforce the students' ability to identify, analyze, interpret, and evaluate arguments, data, evidence, problems, and conclusions as part of formulating an opinion or conclusion. Then use that information to design, evaluate and implement a strategy to achieve a desired outcome.
- This course meets the Essential Learning Outcome of Quantitative Literacy as defined under the Core Curriculum requirements. As such, the course will strengthen the students' competency and comfort in working with numerical data.

- This course meets the Essential Learning Outcome of Information Literacy as defined under the Core Curriculum requirements. As such, it provides students with the opportunity to practice the skills needed to successfully locate, evaluate, and use data, a fundamental ability for scholars and citizens operating in a complex, global information landscape.

Course Prerequisites

- Computing II (COMP.1020/91.201)
- Discrete Math I & II (MATH.3201/92.321, MATH3220/92.322)
- Statistics for Scientists and Engineers (MATH3860/92.386)
- Calculus I-II (MATH.1310-2310 /92.131-231)

Additional Course Information

Class Website – on Blackboard. All class materials (including lecture notes, supplemental materials, etc.) and assignments are posted on Blackboard. Assignments should be submitted through Blackboard if an electronic version is required.

Class Discussion Website – https://piazza.com/configure-classes/summer2019/comp4040011

This online discussion board may be used to clarify your question about assignments and discuss general questions. When possible, students should ask related questions through this website instead of sending individual emails to the instructor. Please do NOT post your programming code or solutions there. If you have a specific question about your solution, please ask help from the instructor, TA, grader, or approved tutors in their offices.

Methodology

Teaching methods:

This course will make use of lectures, examples, and question and answer sessions. Class discussions (either in small group or with whole class), in addition to active reading, experimenting with sample programs, and problem solving, will be used during the semester. Independent homework assignments are used to evaluate the learning outcomes.

This is primarily a "paper-and-pencil" course whose homework, quizzes, and exams involve writing algorithms using "pseudo-code", establishing their correctness and analyzing their efficiency. Although programming will not be required, programs will be provided whenever possible to illustrate and reinforce concepts. Students are also encouraged to implement their algorithms.

Assessment:

There will be in-class exercises, regular problem sets and quizzes for each chapter (or two chapters), and a comprehensive final exam.

Course readings:

Readings are to be completed before the class session for which they have been assigned; material covered in each reading is fair game for class discussions and unannounced quizzes.

Assignments:

Assignments will be distributed via a mixture of paper and electronic means. Students are responsible for managing due dates and understanding submission procedures to turn in

assignments. It is recommended that homework would be typed. A paper copy must be submitted (please keep a copy for yourself). The Tentative Homework Deadline is attached at the end.

Quizzes and Exam:

The course will have 8 quizzes, one for each chapter (or two chapters). Each quiz may have different weights and can be cumulative. The comprehensive final exam for this class will be given on July 1st, 2019 during the class time. Tentative Quiz Schedule is attached at the end.

Grading:

Homework Average	30%
Chapter Quiz Average	35%
Final Exam	30%
Discretionary (e.g., attendance, participation)	5%

Course Policies

Attendance:

Formal attendance is **mandatory**. Three unexcused absences are permitted. Additional absences may result in a failing grade and/or removal from the course.

If the instructor is running late to class, please wait for 20 minutes.

Academic integrity:

The practice of good ethical behavior is essential for maintaining good order in the classroom, providing an enriching learning experience for students, and as training as a practicing computing professional upon graduation. This practice is manifested in the University's Academic Integrity policy. Students are expected to strictly avoid academic dishonesty and adhere to the Academic Integrity policy as outlined in the course catalog. Violations will be dealt with as outlined therein.

<u>As a general rule, all work submitted for grading must be the student's OWN work</u>.

In regard to homework, students may discuss the problems (what is being asked for), appropriate material from class lectures, the textbook or acceptable other sources. Students, however, **may not share answers or the specifics of how to answer the question**.

Use of material from previous classes, solution manuals, material from the Internet or other sources (e.g., parents, siblings, friends, etc.) that directly bears on the answer is strictly prohibited. Please cite the references if you use any help.

In addition, you are not allowed to post course materials and solutions to problem sets assigned in this class in public places (e.g. Github, courseHero) without the instructor's permission. Solutions include your own solutions as well as solutions that may be provided by the instructor. The University policy on academic integrity states that assisting students in their own acts of academic dishonesty is itself a violation of academic integrity, see Academic Misconduct Subject to Disciplinary Action, 1(f). Doing so will be considered an act of academic dishonesty and you will receive a grade of F for the course.

At the discretion of the instructor, students may be asked to sign a statement that they have abided by the University's Academic Integrity policy and its application to this class. This statement may appear on homework, or tests.

When in doubt, consult the course professor before doing something that may result in violation of the University's Academic Integrity policy (https://www.uml.edu/catalog/undergraduate/policies/academic-policies/academic-integrity.aspx).

The sanction for the first violation of the Academic Integrity policy or plagiarism policy will result in a minimum failing grade on the relevant assignment and the violation will be reported to the student's department chair and the University Provost Office. Once the final decision has been rendered and any or all appeals exhausted by any parties involved, the instructor or appropriate parties will carry out the recommended sanction.

Personal conduct:

In order to minimize distractions and interruptions, students will be expected to:

1. Arrive to class on time and fully prepared.
2. Give the instructor full and undivided attention once the lecture has begun.
3. Turn off and stow all cell phones, pagers, and any other personal electronic devices once the lecture has begun. Computers are generally not needed for the class.

Failure to adhere to these policies may result in immediate dismissal from class and loss of any in-class credit for relevant assignments or activities.

Re-grading Assignments:

Requests for re-grading may be made up to one week after the assignment is returned. Please contact the TA/grader (if available) first if you have any questions about the grading. If you still have questions, the request must be made in person with the instructor or be submitted in writing and include a short paragraph outlining the rationale for the re-grade. Acceptable requests include correcting errors in calculating a score, marking a correct answer incorrect, etc.

Late work:

Late assignments will not be accepted without PRIOR approval. Students must consult the instructor at least two days prior to the scheduled due date to make alternative arrangements; however, the instructor is under no obligation to grant any such request. Penalties such as a reduced score may be applied at the instructor's discretion. Internet or computer issues are NOT excuses of late submission.

In-class quizzes and exams will not be rescheduled except in the event of an excused absence. The instructor will work with the student to schedule such a makeup exam; however, it is in the student's best interest not to miss the regularly scheduled in-class quiz/exam.

Tentative Schedule

Week	Topic	Reading	Homework	Quiz
1	**Foundations** Introduction/Overview	Appendix A; B1, B2, B3 Chapter 1		
1	Analyzing & Designing Algorithms	Chapter 2	HW1	Quiz1
1, 2	Growth of Functions	Chapter 3	HW2	Quiz2
2, 3	Divide-and-Conquer, Recurrences	Chapter 4	HW3	Quiz3
3,4	Probability & Randomized Algorithms	Chapter 5, Appendix C1-C4	HW5	Quiz4
3, 4	**Sorting** Quicksort	Chapter 7	HW4 HW5	Quiz4
4	Heap/Priority Queues	Chapter 6	HW6	Quiz5
5	Sorting in Linear Time	Chapter 8	HW7	Quiz6
Self review	**Data Structures** Stacks, Queues, Linked Lists, Trees	Chapter 10		
5,6	Hash Tables	Chapter 11	HW8	Quiz7
6	BST& Balancing Trees: Red-Black Trees	Chapter 12 & 13	HW9	Quiz8
7	**Final Exam**	All above chapters	HW10	

Tentative Homework Deadline

Homework	Due Date
HW1	05-23-19 (Th)
HW2	05-30-19 (Th)
HW3	06-05-19 (W)
HW4	06-10-19 (M)
HW5	06-13-19 (Th)
HW6	06-17-19 (M)
HW7	06-20-19 (Th)
HW10	06-24-19 (M)
HW8	06-26-19 (W)
HW9	06-27-19 (Th)

Tentative Quiz Schedule

Quiz	Date
Quiz1	05-29-19 (W)
Quiz2	06-03-19 (M)
Quiz3	06-06-19 (Th)
Quiz4	06-17-19 (M)
Quiz5	06-19-19 (W)
Quiz6	06-24-19 (M)
Quiz7	06-26-19 (W)
Quiz8	06-27-19 (Th)