

Course Syllabus

COT4400: Analysis of Algorithms

CHE 103

Tuesday, Thursday 5:00 pm-6:15 pm

Instructor Information

William Hendrix whendrix@usf.edu Office hours: ENB

343F Tuesdays, 6:30-7:30 pm Wednesdays, 2:00-3:00 pm ...or
by appointment

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Teaching Assistant

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325 Thursdays 10:00 am-12:00 pm Yu

Peng yupeng@mail.usf.edu Office hours: ENB 325 Mondays 12:00-
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Course Description

Design principles and analysis techniques applicable to various classes of computer algorithms frequently used in practice. (3 hours)

Course Objectives and Learning Outcomes

On successful completion of the course, students should be able to:

- reason about an algorithm's correctness
- use Big-Oh notation to describe the time complexity of an algorithm
- analyze the complexity of previously unseen algorithms
- understand the trade-offs involved in using different data structures and assess their pros and cons under various conditions
- understand various algorithm design strategies, including greedy algorithms, divide-and-conquer, dynamic programming, and backtracking
- understand the advantages and disadvantages of several traditional search and graph algorithms
- apply the preceding knowledge and skills in order to develop novel algorithms

- understand the definition and importance of the class NP
- perform polynomial-time problem reductions

Textbook

Required: *The Algorithm Design Manual*, Steven Skiena, 2nd ed.

I will not assign homework or other problems from the Skiena book, though I will provide recommended readings and exercises in the lectures for those who wish to follow along.

Homework Policy

Homework will be assigned during the course and will generally be due two class periods after it is assigned.

Homework will be divided into **Submitted** and **Graded** assignments, though the type of assignment will not be announced until it is submitted.

Submitted assignments will be checked for completion of all problems, while **Graded** assignments will be graded based on correctness.

Homework assignments will be accepted at the beginning of class or online until 11:59 pm the day it is due. **Assignments will not be accepted after this time.**

You may discuss homework assignments with your fellow students; however, this collaboration opportunity is **not** a license to copy the work of others. In addition, failure to properly cite external sources such as websites for homework assignments is a violation of academic integrity and will be dealt with accordingly (see Class Policies section).

Exams

There will be four exams:

- The first exam should cover algorithm correctness and Big-Oh notation and will be given on 9/22.
- The second exam should cover data structure complexity and sorting and will be given on or around 10/13.
- The third exam should cover dynamic programming and graphs and will be given on or around 11/10.
- The final exam will not be cumulative but should instead cover graph algorithms and complexity theory. The final will be given on 12/8, 3:00-5:00 pm.

Note: the instructor reserves the right to adjust exam topics to align with the material covered in class.

For exams 1 and 3, you will be allowed one sheet of notes if the corresponding feedback form is submitted at the beginning of the exam period (see Feedback section). Everyone is allowed one sheet of notes for

exam 2 and the final exam.

Grading

Grades will be calculated as a weighted average with the following weights:

| <u>Category</u> | <u>Weight</u> |
|------------------------|----------------------|
| Homework | 20% |
| Projects (4) | 10% each |
| Exams (3) | 10% each |
| Final Exam | 10% |

Note: If you believe that an error has been made in grading, a request must be submitted to the TA no later than one week after the assignment or exam is returned.

Letter grades will be assigned according to the following scale:

| <u>Grade Range</u> | <u>Letter</u> |
|---------------------------|----------------------|
| >= 93.0 | A |
| 90.0-92.9 | A- |
| 87.0-89.9 | B+ |
| 83.0-86.9 | B |
| 80.0-82.9 | B- |
| 77.0-79.9 | C+ |
| 73.0-76.9 | C |
| 70.0-72.9 | C- |
| 60.0-69.9 | D |
| < 60.0 | F |

Feedback

There will be two feedback forms distributed during the course. Both of these forms will be distributed at the beginning of a course section, and they will be collected at the beginning of an exam period. Submission of these forms will allow the use of a single sheet of notes (one-sided) for the corresponding exam. These forms may be turned in at any time, but you will only be allowed the sheet of notes if they are submitted at the start of the exam period.

Additional feedback (positive or negative) is *highly encouraged* throughout the course. Feedback may be sent to the instructor (whendrix@usf.edu) by email, Canvas, or Piazza.

Class Policies

Late Assignments

Missed exams or assignments will not be made up without confirmation of a serious medical issue, family emergency, or major religious

observances. Students who know they will not be able to attend class should notify the instructor as soon as possible in order to develop contingency plans. The instructor may, at his discretion, provide make-up assignments, extended deadlines, or other remedies for those with excused absences.

Attendance

Class attendance is recommended, but not required. There may be opportunities for bonus credit in class that will not be available for students not in attendance, and some exercises or materials may not be made available outside of class.

Academic Integrity/Academic Dishonesty

I expect students to be honest and not cheat on their homework/projects/exams. Each student should work independently on all homework, examinations, and individual projects. Students should only work with their assigned group members on group projects. In light of this, I expect you to read the University's policies on student conduct, academic dishonesty, etc.

Please see the University's Undergraduate Catalog regarding these policies at

<http://www.ugs.usf.edu/catalogs/1213/pdf/AcademicIntegrityOfStudents.pdf>

(Links to an external site.)

. I also expect you to read and understand the ACM definition of plagiarism (http://www.acm.org/publications/policies/plagiarism_policy)
(Links to an external site.)

). Students caught cheating will be punished by receiving zero credit on the affected assignments, receiving an FF grade in the course, and/or other sanctions, based on the severity of the offense.

The University of South Florida has an account with an automated plagiarism detection service which allows instructors to submit student assignments to be checked for plagiarism. I reserve the right to submit assignments to this detection system. Assignments are compared automatically with a huge database of journal articles, web articles, and previously submitted projects and papers. The instructor receives a report showing exactly how a student's paper or code was plagiarized.

Tue Sep 1, 2015 Homework 1 11:59pm **Thu Sep 3, 2015** Homework 2 11:59pm **Tue Sep 8, 2015** Homework 3

Tue Sep 1, 2015 Homework 1 11:59pm **Thu Sep 3, 2015** Homework 2
Homework 1

Thu Sep 3, 2015 Homework 2 11:59pm **Tue Sep 8, 2015** Homework 3
Homework 2

Tue Sep 8, 2015 Homework 3 11:59pm **Thu Sep 10, 2015** Homework 4
Homework 3

Thu Sep 10, 2015 Homework 4 11:59pm **Thu Sep 17, 2015** Homework 5
Homework 4

Thu Sep 17, 2015 Homework 5 11:59pm **Tue Sep 22, 2015** Exam 1
Homework 5

Tue Sep 22, 2015 Exam 1 6:15pm **Tue Oct 13, 2015** Exam 2
Exam 1

Tue Oct 13, 2015 Exam 2 6:15pm **Tue Nov 10, 2015** Exam 3
Exam 2

Tue Nov 10, 2015 Exam 3 6:15pm **Tue Dec 8, 2015** Final Exam 5pm
Exam 3

Tue Dec 8, 2015 Final Exam 5pm
Final Exam