COT 5405: Analysis of Algorithm

Basic Information

Class Hours: Tuesday and Friday Period 8, Thursday Period 4

Classroom: NEB 0201

Description: This graduate-level course provides a broad view of concepts and techniques in terms of designing and analyzing algorithms. The course will cover both classic techniques such as greedy approaches and dynamic program algorithms along with their theoretical analyses and advanced techniques such as Linear Programming and Approximation Algorithms.

Instructor:

Dr. My T. Thai, Computer and Information Science and Engineering department, University of Florida

- **Office**: E550 CSE Bldg
- **Office Hour**: Tuesday, 9:30am – 11:10am
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Teaching Assistants:

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Course Objectives

As a sequence of well-defined instructions used for accomplishing specific computing tasks, the term Algorithm has been proposed for a long time. The rapid increasing in the number of nowadays computer-aid applications calls for algorithms not only feasible, but also efficient in terms of time and space complexity. What is an efficient algorithm and how to design an efficient algorithm form the main motivation of this course.

Specifically, the objectives of this course are to illustrate various solution techniques, such as greedy approaches and dynamic programming, to present many algorithm analysis methods, like the master theorem, and to introduce a series of problem hardness classes, including NP-hard and Polynomial Hierarchy.
The course also covers recent advances in designing algorithms, including Linear Programming and Approximation Algorithms.

Above all, the main objective of this course is for YOU to enjoy the freedom and beauty of design.

**Pre-requisites**

This is a graduate-level course, so the participants are expected to have taken preliminary courses in Data structures and Algorithms (COT3530), as well as Applied discrete structures (COT3100) or be familiar with the following basis:

- Ordinary data structures: array, link list, stack, queue, priority queue, heap and binary tree;
- Knowledge in discrete structures: set theory, induction/contradiction proofs, graph theory, algebraic systems, combinations/permutations;
- Math skills: calculus, limits, arithmetic and geometric series, probability theory.

**Course Materials**

- **Required Textbooks:**
- **Recommended Textbooks:**
- **Referred Conferences:**
  STOC, FOCS, SODA, COCOON, COCOA.
- **Referred Journals:**

**Coursework**

- 6 homework assignments (30%): **No late submissions will be accepted.**
- 2 in-class Mid-term exams (each 20%):
  - Open books, open notes.
  - 2-hour exams
- 1 final Exam (30%): **Comprehensive**
Course Policies

- Each HW is equally weighted. **The homework will be strictly due at the beginning of class on the due date. NO late homework submissions will be accepted and there will be no electronic submission. All homework must be turned in on paper with the student’s name and section number written clearly on it.**
- NO makeup exams except for **severe** medical emergencies with **doctor-proof**.
- **Time Window** policy for EDGE students: the submission deadline for distance students is **2 days** later than that for on-campus students; distance students will also have a **2-day** window following the on-campus exam date to schedule and complete exam with their proctors.
- All re-grading requests MUST be submitted at TA office hours within **one week** since the returning of the homework/exams.
- No requirements on the lecture attendance, but **you are responsible for all the announcement and materials mentioned in the class, including several new materials that are not covered in the textbook.**
- **Absolutely zero tolerance on plagiarism.** You MUST work on your own for all the homework and exams. Any cheating behaviors on caught will be reported to the department. Refer to the university academic dishonesty rule at **Academic Honesty Guidelines**.
- Using published solutions or ones from previous semesters in the homework submissions will be considered as cheating.
- You will be asked to sign this following statement on all exams: **On my honor, I have neither given nor received unauthorized aid on this exam**.
- Please turn your cell phone to OFF or SILENT mode in class. Chatting or web-browsing on laptops is also strongly discouraged.
- Any issues regarding counseling and mental health, please refer to
  - **University Counseling Services**
  - **Student Mental Health Services**
- Students with disabilities requesting class accommodation MUST register with the Dean of Students Office first.