

Welcome to Data Structures & Algorithms

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Course contents

1. Describe object-oriented programming and use objects to construct linked lists, trees, and graph data structures
2. Understand the fundamental data structures such as hash tables, disjoint union, stack and queue.
3. Analyze and compare algorithmic complexity using “big-O” notation
4. Apply classical algorithms and data structure to problems in data science.

https://github.com/USFCA-MSDS/MSDS_689

Course projects

- Write k-means clustering object-oriented (8%)
 - Do some running time analysis and explore complexity in practice.
 - Image compression applications
- Hierarchical clustering using union find (17%)
- K-means on graphs(18%) : how to do clustering on graphs.

Student evaluation

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Artifact	Grade Weight	Due date
HW1	8%	Sat, Feb 3 11:59pm
HW2	17%	Sat, Feb 24 11:59pm
HW3	18%	Sat Mar 2 11:59pm
Exam 1	25%	Th Feb 15
Exam 2	25%	Fri Mar 8
Attendance and participation	7%	attend <i>all</i> lectures and actively participate in class

Exams

Exam 1 (Feb 15) : The following lectures will be on exam 1

- Lecture 1, 2 and 3.
 - Everything we cover in the lectures and the homeworks are fair game on the exam.

Exam 2 (March 8) : The following lectures will be on exam 2

- Comprehensive but emphasis on lectures 3,4,5.
 - Everything we cover in the lectures and the homeworks are fair game on the exam.

Homework and exam scope

Exams will cover more theoretical concepts that are covered in the lectures

There will be small coding snippets on the exam and there will be questions about them.

The exams and the homeworks are complimentary.
For example, in the homework you will see more algorithmic questions tailored to solve data science questions.

Office hours

On campus : Friday 1:00pm to 2:00pm

Virtual : Tuesday 12:30 – 2:00pm

Resources

- Free book on [algorithms by Jeff Erickson](#).
- Great book but not free [Introduction to Algorithms](#)