Design and Analysis of Algorithms

SYLLABUS FOR DESIGN AND ANALYSIS OF ALGORITHMS (CSCI 174)	
Fall 2017	California State University, Fresno
Course Information	Dr. David Ruby, PhD
Units : 3	Office Number : Sci II 273
Time : 10:00 – 10:50MWF	E-Mail : druby@csufresno.edu
Location: McKee Fisk 208	Telephone : 278-4312
Website	Office Hours

This syllabus and schedule are subject to change in the event of extenuating circumstances. If you are absent from class, it is your responsibility to check on announcements made while you were absent.

Prerequisites

CSci 115, and CSci 119

Required Textbooks and Materials

Introduction to Algorithms, Third Edition

by Cormen, Leiserson, Rivest, & Stein, from MIT Press & McGraw-Hill

Web Resources (Freely Available):
www.codeeval.com

Grading

There are a total of 1000 points available for the class. Final letter grades will be assigned based on the points earned and the standard grade scale listed below, with adjustments to this scale made as needed based on the final distribution of points earned by the class:

A: 900-1000
B: 800-899
C: 700-799
D: 600-699
F: < 600

Course Goals and Primary Learning Outcomes

Course Goals:

1. Provide deeper understanding of key algorithms & data structures of computer science.
2. Provide opportunities to solve computational problems w/ key algorithms and data structures.

Primary Learning Outcomes:

- Understand complexity classes P/NP and their classic problems.
- Understand key algorithm design methods Divide-and-Conquer, Greedy, Dynamic Programming w/ classic problems and analysis.
- Understand key analysis techniques of Recurrences, Probabilistic Analysis, Amortized Analysis.
- Understand Trees & Graphs together w/ key algorithms & classic problems.
    - Maximum Flow
    - Minimum-Spanning Trees
- Understand advanced algorithms:
    - Computational Geometry

Date	Assignment/Examination/Presentation	Points
Various	In-Class	100
	Computational Geometry/Bay Bridges https://www.codeeval.com/open_challenges/109/	100
	Recurrence Relations w/ Master Method	100
	Graphs: BFS, DFS	200
	Midterm	200
	Final	300

Tentative Course Schedule

Fall 2017

(Monday, Wednesday, Friday Courses)

	Date	Topic	Reading Assignment
1	Wed., Aug 23	Class Introduction	
2	Fri., Aug 25	Algorithms Introduction	Chapter 1
3	Mon., Aug 28	Asymptotic Notation Review	Chapter 2, 3
4	Wed., Aug 30	Computational Geometry	Chapter 33
5	Fri., Sept 1	Computational Geometry	Chapter 33
	Mon., Sept 4	HOLIDAY – Labor Day	
6	Wed., Sept 6	Divide & Conquer	Chapter 4
7	Fri., Sept 8	Recurrence Relations/Master Method	Chapter 4
8	Mon., Sept 11	Probabilistic Analysis	Chapter 5
9	Wed., Sept 13	Randomized Algorithms	Chapter 5
10	Fri., Sept 15	Data Structures	Chapter 10
11	Mon., Sept 18	Hashing	Chapter 11
12	Wed., Sept 20	Hashing	Chapter 11
13	Fri., Sept 22	Binary Search Trees	Chapter 12
14	Mon., Sept 25	Balanced Binary Search Trees	Chapter 13
15	Wed., Sept 27	Balanced Binary Search Trees/Red-Black	Chapter 13
16	Fri., Sept 29		
17	Mon., Oct 2		
18	Wed., Oct 4		
19	Fri., Oct 6		
20	Mon., Oct 9	Review	
21	Wed., Oct 11	Review	
22	Fri., Oct 13	Midterm	
23	Mon., Oct 16	22: Graphs	Chapter 22

24	Wed., Oct 18	BFS		
25	Fri., Oct 20	DFS/Topological Sort/ Strongly Connected Components		
26	Mon., Oct 23	Minimum Spanning Tree	Chapter 23	
27	Wed., Oct 25	Kruskal		
28	Fri., Oct 27	Primm		
29	Mon., Oct 30	Shortest Path	Chapter 24	
30	Wed., Nov 1	Bellmann-Ford		
31	Fri., Nov 3	Dijkstra		
32	Mon., Nov 6	All-Pairs Shortest Paths	Chapter 25	
33	Wed., Nov 8	Floyd-Warshall/Johnson		
	Fri., Nov 10	HOLIDAY – Veteran's Day		
34	Mon., Nov 13	Maximum Flow	Chapter 26	
35	Wed., Nov 15			
36	Fri., Nov 17			
37	Mon., Nov 20			
	Wed., Nov 22	HOLIDAY – Thanksgiving Break		
	Fri., Nov 24	HOLIDAY – Thanksgiving Break		
38	Mon., Nov 27			
39	Wed., Nov 29			
40	Fri., Dec 1			
41	Mon., Dec 4			
42	Wed., Dec 6	Last Day of Instruction		

Finals week	**Days**	**Dates**
Final Exam Preparation & Faculty Consultation Days:	Thursday and Friday	Dec 7 & 8
Final Semester Examinations	Monday – Thursday	Dec 11 – 14
Final Exam in this course		

University Policies

(http://www.csufresno.edu/academics/documents/RequiredSyllabusPolicyStatements_001.doc)

Students with Disabilities:

Upon identifying themselves to the instructor and the university, students with disabilities will receive reasonable accommodation for learning and evaluation. For more information, contact Services to Students with Disabilities in the Henry Madden Library, Room 1202 (278-2811).

Honor Code:

"Members of the Fresno State academic community adhere to principles of academic integrity and mutual respect while engaged in university work and related activities." You should:

a) understand or seek clarification about expectations for academic integrity in this course (including no cheating, plagiarism and inappropriate collaboration)

b) neither give nor receive unauthorized aid on examinations or other course work that is used by the instructor as the basis of grading.

c) take responsibility to monitor academic dishonesty in any form and to report it to the instructor or other appropriate official for action.

Instructors may require students to sign a statement at the end of all exams and assignments that "I have done my own work and have neither given nor received unauthorized assistance on this work." If you are going to use this statement, include it here.

Cheating and Plagiarism:

Cheating is the actual or attempted practice of fraudulent or deceptive acts for the purpose of improving one's grade or obtaining course credit; such acts also include assisting another student to do so. Typically, such acts occur in relation to examinations. However, it is the intent of this definition that the term 'cheating' not be limited to examination situations only, but that it include any and all actions by a student that are intended to gain an unearned academic advantage by fraudulent or deceptive means. Plagiarism is a specific form of cheating which consists of the misuse of the published and/or unpublished works of others by misrepresenting the material (i.e., their intellectual property) so used as one's own work." Penalties for cheating and plagiarism range from a 0 or F on a particular assignment, through an F for the course, to expulsion from the university. For more information on the University's policy regarding cheating and plagiarism, refer to the Class Schedule (Legal Notices on Cheating and Plagiarism) or the University Catalog (Policies and Regulations).

Computers:

"At California State University, Fresno, computers and communications links to remote resources are recognized as being integral to the education and research experience. Every student is required to have his/her own computer or have other personal access to a workstation (including a modem and a printer) with all the recommended software. The minimum and recommended standards for the workstations and software, which may vary by academic major, are updated periodically and are available from Information Technology Services or the University Bookstore (http://www.kennelbookstore.com). In the curriculum and class assignments, students are presumed to have 24-hour access to a computer workstation and the necessary communication links to the University's information resources."

Disruptive Classroom Behavior:

"The classroom is a special environment in which students and faculty come together to promote learning and growth. It is essential to this learning environment that respect for the rights of others seeking to learn, respect for the professionalism of the instructor, and the general goals of academic freedom are maintained. Differences of viewpoint or concerns should be expressed in terms which are supportive of the learning process, creating an environment in which students and faculty may learn to reason with clarity and compassion, to share of themselves without losing their identities, and to develop an understanding of the community in which they live. Student conduct which disrupts the learning process shall not be tolerated and may lead to disciplinary action and/or removal from class."

Copyright Policy:

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