CS380 Algorithm Design and Analysis
Spring 2009

Catalog Description

An introduction to the formal techniques that support the design and analysis of algorithms, focusing on both the underlying mathematical theory and the practical considerations of efficiency. Topics include asymptotic complexity bounds, techniques of analysis, algorithmic strategies, advanced data structures, graph theory and other selected topics.

Topics

- Asymptotic analysis of upper and average complexity bounds
- Identifying differences among best, average, and worst case behaviors
- Big O, little o, omega, and theta notation
- Standard complexity classes
- Empirical measurements of performance
- Time and space tradeoffs in algorithms
- Using recurrence relations to analyze recursive algorithms
- Brute-force algorithms
- Greedy algorithms
- Divide-and-conquer
- Backtracking
- Branch-and-bound
- Heuristics
- Pattern matching and string/text algorithms
- Numerical approximation algorithms
- Simple numerical algorithms
- Sequential and binary search algorithms
- Quadratic sorting algorithms (selection, insertion)
- O(N log N) sorting algorithms (Quicksort, heapsort, mergesort)
- Representations of graphs (adjacency list, adjacency matrix)
- Depth- and breadth-first traversals
- Shortest-path algorithms (Dijkstra's and Floyd's algorithms)
- Transitive closure (Floyd's algorithm)
- Minimum spanning tree (Prim's and Kruskal's algorithms)

The above topics were copied with permission from the Computing Curricula 2001 recommendations found at: http://www.sigcse.org/cc2001/.

Instructor Details

Professor:	Shereen Khoja
Email:	shereen@pacificu.edu
Office:	Strain 203C
Phone:	(503) 352-2008
Office Hours:	M 10:30am – 11:30am W 01:30pm – 03:00pm Th 02:30pm – 04:00pm or by appointment

Course Details

Course Title:	CS380 Algorithm Design and Analysis
Prerequisits:	CS300 Data Structures with a grade of C or better and MATH240 Discrete Mathematics with a grade of C or better
Required for:	Computer Science Major
Meeting Times:	TTh 09:40am – 10:55am (Block K)
Location:	Price202
Textbooks:	Introduction to Algorithms by Cormen, Leiserson, Rivest, and Stein
Software:	Microsoft Visual Studio 2008. Copies will be provided by the instructor
Course Website:	http://zeus.cs.pacificu.edu/shereen/cs380sp09/cs380.htm

Course Assessment

As a general rule of thumb, students are expected to spend 2 hours outside of class for each hour of class time. This means that you should be spending 6 hours per week outside of class on the readings, projects, and homework. At least 1 hour a week should be spent on non-assignment based studying

Grade Distribution:

Programming Assignments	30%
Homework	10%
Unscheduled Quizzes (open-note)	10%
2 Exams	30%
Final Exam	20%

Programming Projects Grading:

Successful Execution	70%
Acceptable structure, style, documentation, and efficiency. You must follow the C++ Coding Standards, version 4.0	30%

Percent Breakdown:

			92-100%	A		90-92%	A-
88-90%	B+		82-88%	B		80-82%	B-
78-80%	C+		72-78%	C		70-72%	C-
68-70%	D+		60-68%	D			
			0-60%	F			

Important Dates

Tentative dates for Exams:
Exam 1: Thursday, March 5, 2009
Exam 2: Thursday, April 16, 2009

Spring Break:
Monday, March 23, 2009 – Friday, March 27, 2009 (No Class)

Senior Projects Day:
Wednesday, April 22, 2009 (No Class)

Reading Day:
Thursday, May 14, 2009

Date of Final:
Friday, May 15, 2009, 12:00pm - 03:30pm

Academic Calendar:
http://www.pacificu.edu/calendar/academic/ascalendar0809.cfm

Course Policies

1. **Attendance:** Attendance at every class is critical to your success in this course. I expect you to be on time and ready to go once it is 9:40am and that you stay until the end of class. You will not be allowed into the classroom once I close the door and start teaching. Any missed lecture is your responsibility to make up; just remember that if you fall behind, it will be very difficult for you to catch up.

    - I reserve the right to raise or lower your grade based on class participation and attendance. Specifically, I may lower your grade or may officially withdraw you from the course through the tenth week of the semester for poor attendance or participation. Further, your final grade may be lowered by 1/3 of your final course grade for each day (or portion thereof) of class missed. Please notify me PRIOR to class if you must miss class for any reason.

2. **Programming Assignments:** All assignments are to be programmed in C++ in Visual Studio. Both the electronic copy and hardcopy of your assignments are due at 9:40am on the day that they are due.

    - The hardcopy must be placed on the instructor's desk before 9:40am on the day the assignment is due. If the hardcopy uses more than one sheet, then all sheets must be stapled. The code must be printed in color. Failure to submit a hardcopy of the assignment will result in a loss of 30% of the assignment points.

    - The electronic copy must be placed in the `CS380 Drop' folder on Turing by 9.40am on the day the assignment is due. Failure to submit an electronic copy will result in a loss of 70% of the assignment points.

    - A program that does not successfully compile or produces no output loses 70% of the assignment grade.

    - Assignments can be turned in up to 24 hours late with a penalty of 10% of the grade. If the assignment is between 24 and 48 hours late you will lose 20% of your grade. Anything turned in later than 48 of the assignment deadline will NOT be accepted.

    - *One exception.* I do allow one programming assignment to be turned in up to ONE day late without penalty. Your reason does not matter and I do not need to know why. All other late assignments will carry the standard loss of points. To use this gift, you *must* send me an email before 9:40am on the day the assignment is due. This email is to have GIFT as the subject and you must include your name and the assignment number and name in the body of the email. If this information is not included in the email then the assignment will be considered late.

    - Make sure that you test your programs before submitting them. You may only submit your assignment once.

    - All code in any form generated from this course becomes the intellectual property of Pacific University. You may not share this code with anyone without obtaining written permission from Pacific University.

3. **Homework Assignments:** All homework must be placed on the instructor's desk by 9:40am on the day it is due. The homework does not have to be word-processed, but you must make sure that it is neat and tidy, and if multiple sheets of paper are used then these must be stapled.

4. No early or late exams/final will be given. No incompletes will be given.

5. **Academic Dishonesty:** Pacific University has no tolerance for academic dishonesty. It is university policy that all acts of academic dishonesty be reported to the Associate Dean. Forms of academic dishonesty include, but are not limited to, plagiarism, fabrication, cheating, tampering with grades, forging signatures, and using electronic information resources in violation of acceptable use policies. Please consult the Academic Conduct Policies in the A&S Catalog for more details.

    - For programming assignments, plagiarism takes the form of, *but is not limited to* copying code from someone else, whether copying files, glancing at someone else's code, typing from someone else's notes or typing while they dictate. The source can be a classmate, former student, website, program listing found in the trash, or anything else. Furthermore, plagiarism even on a small part of the program is cheating.

    - You should also note that aiding someone else's cheating also constitutes cheating. You should never leave your code where someone else could have access to it, such as staying logged onto a machine or placing solutions in the recycling bin where another student may take it.

    - Sanctions that may be imposed for academic dishonesty are:

        - First offense for cheating on an exam: zero on the exam.

        - First offense for cheating on a programming assignment or written homework: zero on the assignment and 5% subtracted from your course total.

        - Second offense for cheating of any kind: `F' in the course

6. Neither computer failure, software failure, nor lack of computer access are accepted as excuses for late programs; therefore, start work on the programs as soon as they are assigned, and don't put them off until the last minute. Further, corruption of programs due to bad disk media is also not accepted as an excuse for late programs; therefore, always keep a current backup of all programs on a separate disk. Please note that the Computer Science departmental servers are not backed up.

7. You may be asked to leave the class if you are causing a distraction e.g. cell phone ringing, talking, etc.

8. If you have a complaint regarding a grade on an assignment or exam, write a one paragraph description of why you feel the grade is incorrect and deliver it to the instructor within five working days of when the graded material was returned to you. I will not consider any grade changes later than five working days after the graded material was returned.

9. If you have a documented disability covered under the ADA then services and accommodations are available from LSS (Learning Support Services). If you need reasonable accommodations to fully participate in course activities or meet course requirements, you must contact Edna K. Gehring, Director of LSS, at X2107. She will meet with you, review the documentation of their disabilities, and discuss the services Pacific offers.