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Spring 2013

CS 7220: Computability and Complexity

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CS 7220 – COMPUTABILITY AND COMPLEXITY
 SPRING, 2013

Instructor: Dr. Michael Raymer
 391 Joshi
 775-5107
michael.raymer@wright.edu

Time/Place: Tuesdays & Thursdays, 5:00 – 6:20 pm, 154-A Russ Ctr.

Office Hours: Tuesdays & Thursdays, 2:00 – 3:30 pm, *or by appointment.*

Textbook: Sudkamp, T. *Languages and Machines, 3rd Ed.* ISBN 0-321-32221-5.
Required.

Objectives: We will use the formal algorithm system provided by Turing machines as a tool to understand the computability and complexity of decision and optimization problems, and the algorithms that solve them. We will explore the sets P and NP and the implications of membership in these sets.

Tentative Lecture Schedule:

Week(s)	Topics	Reading
1	Introduction, analyzing algorithms	Notes
2	Big-O notation, computational complexity	14.2, notes
3	Turing machines and computation	8.1 – 8.5
4	Variations of Turing machines	8.6 – 8.7
5	Turing computable functions	9.5
6	Decision problems, Church-Turing thesis	11.1 – 11.5
7	Undecidability, Rice's Theorem	12.1 – 12.4
8	Time complexity and Turing machines	14.3 – 14.6
9	Nondeterminism and NP	15.1 – 15.7
10	Cook's Theorem	15.8
11	NPC and reductions	16.1 – 16.4
12	Approximation algorithms	16.5 – 16.6
13	Space complexity & Savitch's theorem	17.1 – 17.4
14	Advanced topics and final exam review	—
—	Final Exam: Tue. Apr. 23, 5:45 – 7:45 pm	—

Grading: Quizzes (5) = 100 pts
 Final Exam = 150 pts
 Homework Assignments (5) = 50 pts

90 – 100% = A; 80 – 89.9% = B;
 70 – 79.9% = C; 60 – 69.9% = D;
 < 60% = F
 I may curve the final letter grades based on the overall distribution of scores.

Homework assignments are due in class on the assigned due date. *There will be no make-up exams except for documented emergencies.* The quizzes and final exam will be open book and open notes.

Attendance: Attendance at the lectures is strongly recommended. If you miss a class, it is your responsibility to obtain notes and assignments from other students and to come prepared for subsequent topics.

Academic Integrity:

It is expected that graded homework assignments, exams, and other course assignments will be completed **on an individual basis**. Students may discuss general concepts with one another, but may not, under any circumstances, work together on the actual implementation of any course assignment. Significant collaboration on any graded assignment will be considered a violation of the university guidelines for academic honesty. If the same work is turned in by two or more students, **all parties involved will be held equally accountable for violation of academic integrity**. You are responsible for ensuring that other students do not have access to your work.

Web Page: <http://pilot.wright.edu> – Login using your CATS username and password. *Check this page often for announcements, assignments, and other important information.*

Other notes: Students with disabilities or any additional needs are encouraged to set up an appointment with me at their convenience to discuss any classroom accommodations that may be necessary.