

University of Pittsburgh
Department of Computer Science

CS 1501
MW 9:30-10:45AM, Sennott 5129
TH 9:30-10:45AM, Lawrence 205
TH 1:00-2:15PM, Lawrence 203

Fall Term 2014
Dr. George Novacky

My office is in 6119 Sennott, Department of Computer Science: phone 412-624-8438
Email: novacky@cs.pitt.edu; office hours: TH 11:00AM-12:30PM, 6119 Sennott Square; M 1:30PM-2:30PM, 140 Thackeray Hall; and by appointment.

TA: See CourseWeb for your TAs office location and hours.

Course:

This course covers a broad range of the most commonly used algorithms. Some examples include algorithms for searching, encryption, compression, network flow and local search. In addition, advanced data structures are covered. Some examples include hash tables, de la Brindais tries, directed and undirected graphs. The students will implement and test several algorithms. The course is programming intensive.

Required Text:

Alg4 = Robert Sedgewick and Kevin Wayne, **Algorithms**, Fourth Edition. Addison Wesley 2011.

Requirements:

Exams: (60%)

Three exams @ 20% each

First Exam: week of October 9/10

Second Exam: week of November 12/13

Third Exam: Group Final (to be announced)

Make-up exams will be given **only** if the student notifies me in advance (except in case of emergency) and presents documentation of a valid excuse.

Assignments: (40%)

6 or 7 - Assignments

Writing Assignments: Students taking CS1501 as a writing course will be required to complete four or five writing assignments. We will be using **Sword**, software developed at Pitt for teaching/grading writing in any Discipline. You should have received an email from **Sword** already. Writing students will be graded on a 125% basis (25% for writing). Each paper will

be graded as follows: writing 40%, helpfulness provided in the peer review 40%, and accuracy of review 20%.

Lecture Attendance: I will not take attendance at lecture but poor performance in the class is most often due to poor attendance at lecture. The more you skip, the more you slip.

Note: If you drop this course, make sure you follow the correct procedure. If your name still appears on the final grade roster, you must be given an **F**, even though you did not take the class. Likewise, if you registered for this course with no intention of taking it and do not drop it, the result will be the same. Save yourself a headache! **Add/Drop period ends Friday, September 6.**

Disability Resources and Services (quoted from the Undergraduate Bulletin):

“The Office of Disability Resources and Services (DRS) provide a broad range of support services to assist students with disabilities. Services include, but are not limited to, tape-recorded textbooks, sign language interpreters, adaptive computer technology, Braille translation, and nonstandard exam arrangements. DRS can also assist students with accessibility to campus housing and transportation. Contact DRS at 412-648-7890 or 412-383-1355 (TTY) in 216 William Pitt Union or see www.drs.pitt.edu for more information.”

Academic Integrity (quoted from the Undergraduate Bulletin):

“As members of the University of Pittsburgh community, A&S students are expected to meet the obligation to exhibit honesty and to respect the ethical standards of the University community and of their chosen field of study in carrying out academic assignments. A&S students are therefore expected to familiarize themselves with the published rules and regulations governing academic integrity.” For the published rules and regulations go to <http://www.as.pitt.edu/fac/policies/academic-integrity>

August

Week 1 *Introductory material, course policies and goals. Algorithm analysis. Alg4 - Section 1.4.*

September

M 2 Labor Day. University Closed.

Week 2 Review of key-searching and associated data structures, *Hashing I. Alg4 – Section 3.4.*

F 6 Add/Drop period ends.

Week 3 Hashing II. *Combinatorial Search (A* algorithm). Alg4 and Notes – Sections 3.4 and page 350.*

Week 4 *Introduction to Graphs, Prim's MST (Lazy vs. Eager versions) Alg4 – Section 4.1-4.2.*

Week 5 *Kruskal's MST, Dijkstra's Shortest Path. Alg4 – Sections 2.4, 4.3-4.4.*

October

Week 6 *Indexed PQ needed for Eager Prim, Introduction to Compression. Alg4 – Section 5.5*

Week 7 **FIRST EXAMINATION.** *Adaptive Huffman. Notes.*

M 14 Fall Break. University closed.

Week 8 *LZW-Compression. Alg4 Section 5.5*

Week 9 *Network Flow: Ford-Fulkerson. Alg4 – pages 886-902. Edmonds-Karp. Alg4 – Section 5.3.*

Week 10 *Substring Matching: (brute- force, KMP, Rabin-Karp). Boyer-Moore. Alg4 – Section 5.3.*

November

Week 11 *Encryption (efficient multiplication, exponentiation, powermod, and greatest common divisor), RSA Encryption. Notes.*

Week 12 **SECOND EXAMINATION.**

Week 13 Using RSA (for Digital envelope, for Digital signature). *Notes.*

W-S November 27-December 1 THANKSGIVING RECESS.

Week 14 Introduction to Dynamic Programming. **Notes.**

December

Week 15 Finish Dynamic Programming, NP and NP-completeness P vs. NP.
Alg4 – 903-921.

M-S December 9-December 14 Final Exams.