CSCI-2300: Data Structures and Algorithms
Sections 2, 3, 4, 7
Spring 2006

1 Course Information

Instructor:	Prof. Srinivas Akella
Email:	sakella@cs.rpi.edu
Office:	MRC 330B, x8770
Office hours:	Monday 2:00-3:00pm, Wednesday 3:00-4:00pm, or after class

Lectures:	Monday, Thursday 12:00pm–1:20pm
Classroom:	Sage 3510
Prerequisites:	Computer Science II (CSCI-1200), Discrete Structures (MATH-2800), and Calculus I (MATH-1010)

Course web page: Course announcements and information will be available at

http://www.cs.rpi.edu/~sakella/dsa

Textbooks:
Required textbook: *Data Structures and Algorithm Analysis in C++, second edition.* Mark A. Weiss, Addison Wesley, 1999.

Required textbook: *Introduction to the Design and Analysis of Algorithms,* Anany V. Levitin, Addison Wesley, 2002.

You will also need a good C++ reference book. One such book is: *The C++ Programming Language, third edition.* Bjarne Stroustrup. Addison Wesley, 1997.

2 Course Overview

We will study intermediate and advanced data structures, computer algorithms, and the analysis of both using techniques from discrete mathematics. Data structures and algorithms form a major component of any software system. When building such a system, a skilled computer scientist must make intelligent decisions about alternative techniques, choosing from existing data structures and algorithms or designing his/her own when necessary. While we will concentrate on the theoretical design and analysis of data structures and algorithms, we will reinforce the theory with examples, laboratories, programming projects, and use of the C++ standard library.

Classes and Class Preparation

This is a 4 credit course that meets in two 80-minute class sessions and one 2-hour lab session each week. Class will consist of lectures that will expand on, explain, and reinforce the reading material. The reading material will be selected sections from the Weiss text and Levitin text. By reading in advance, students will be prepared for class and will be better able to understand the material presented.

Labs

There will be 12 lab sessions during the semester. Some will focus on programming aspects of data structures and algorithms, and some will serve as recitation sessions to go over theoretical material covered in lectures. Labs will be graded, but this grading will be lenient. You **MUST** go to your assigned lab section in order to receive credit for that day's lab. You should take class lecture material and a C++ reference book to labs. Labs will count for 10% of your semester grade.

Section 2	Wednesday 10:00-11:50am	Sage 2715
Section 3	Tuesday 6:00-7:50pm	Sage 2715
Section 4	Wednesday 4:00-5:50pm	Sage 2715
Section 7	Wednesday 2:00-3:50pm	Sage 2715

Programming Projects

There will be four programming projects given throughout the semester. Programs must be written in C++ and should use the standard library as needed. Students will have at least two weeks to do each project. Projects must be submitted by 11:59:59 pm on the scheduled due date. Submission will be through a project submission web page. Programming projects will count for 30% of the semester grade.

Lateness Policy: Each student will be given three days (whole or partial) of grace for late programs. Use these late days carefully. Once you have exhausted these days, **late programs will not be accepted** without a written excuse from the Dean of Students' office. This includes late days for illnesses, plant trips, etc.

As an example, if you submit your 1st program 26 hours late, you will have used two late days and have only one day left. If you submit your 2nd program 5 hours late, you will have used your last late day. If you then submit your 3rd program 1 minute late, it will not be accepted. USE YOUR LATE DAYS WISELY, IF AT ALL. **Students are responsible for keeping track of their usage of late days.**

Written Homeworks

There will be four written homework assignments spaced throughout the semester, supplemented with occasional exercises. These will count for 15% of the semester grade. You will typically have at least a week to complete each homework. **No late homeworks will be accepted.**

Exams

There will be two in-class exams during the semester and a final exam. The three exams together will count for 45% of the course grade. Exams will be based on material covered in class, assigned readings, labs, projects, and homeworks. Exams will be closed-book and crib sheets will not be allowed. The weight of the final will vary for each individual student, depending on how well he or she does on the final. If a student's grade on the final is worse than each of the two in-class exams, then all three exams are worth 15%. If a student's grade on the final is better than at least one of the in-class exams, then the final is worth 25%, the worst in-class exam is worth 5%, and the other in-class exam is worth 15%. No makeup exams will be scheduled; in exceptional circumstances, prior arrangements must be made with the instructor.

Summary of Requirements and Grading:

Laboratories	10%
Programming Projects	30%
Homeworks and exercises	15%
Exams	45%

The maximum lower bound cutoffs for A, B, C, and D grades will be 90%, 80%, 70% and 60%, respectively. Lower cutoffs may be established at the end of the semester when assigning grades.

If you feel there is a grading error on a programming assignment, homework, lab, or exam, you should bring this to the attention of the TA or instructor as soon as you receive your grade and **no later than a week** after you receive the grade. **All grades will be treated as final two weeks after they are issued.**

Class Schedule

Here is a tentative schedule of the coverage of course material, with readings from Weiss. Detailed reading assignments will be given in class.

Class(es)	Date(s)	Topic
1-2	1/19-1/23	Linear structures (Ch 3), math review (Ch 1)
3-6	1/26-2/6	Algorithm analysis, induction, recursion (Ch 1.1-1.3, 2)
7-9, 11	2/9-2/23	Trees (Ch 4)
12	2/27	Hashing (Ch 5)
13-14	3/2-3/6	Priority queues (Ch 6)
15-17	3/9-3/23	Sorting (Ch 7)
18-21, 23-25	3/27-4/20	Graphs and graph algorithms (Ch 9)
26-28	4/24-5/1	Advanced material (Ch 10)

Labs will be held every week of the semester except the weeks of January 16-20, February 20-24, March 13-17 (spring break), and April 3-April 7.

Important Dates

Here is a tentative schedule of homework and project due dates and exam dates.

Class	Date	Event
4	1/30	Homework 1 due
	2/10	Project 1 due
8	2/13	Homework 2 due
10	2/21	In-class exam 1
	3/3	Project 2 due
	3/28	Project 3 due
19	3/30	Homework 3 due
22	4/10	In-class exam 2
25	4/20	Homework 4 due
	4/28	Project 4 due

3 Academic Honesty

Students are encouraged to discuss class material to improve their understanding of the subject. However they must submit their own work for programming assignments, homeworks, labs, and exams.

Academic integrity is a problem on programming assignments. Students naturally want to work together, and it is clear they learn a great deal by doing so. Getting help is often the best way to interpret error messages and find bugs, even for experienced programmers. In response to this, the following rules will be in force. Students are allowed to work together in high-level design of algorithms (i.e., pseudocode), in interpreting error messages, in finding bugs, but NOT in writing code. Students may not share code, copy code, or discuss code in detail (line-by-line or loop-by-loop) while it is being written or afterwards. This extends for upto three days after the submission deadline. Students may not "show" their code to other students as a means of "helping them". Students may not leave their code (either the electronic versions or the printed copies) in publically accessible areas. Students may not use code obtained on the web or from any other sources (unless permitted by the instructor). Students may not receive detailed help on their code from individuals outside the course. Shared or copied code is easy to spot manually and is easily detected using a variety of software tools. Students caught illegally collaborating in writing code or violating the above rules will be penalized according to the severity of the violation. The minimum penalty for a violation is for the student to receive a 0 on the assignment plus a 5 percentage point penalty on their semester grade and a report to the Dean of Students office. Students caught a second time will receive an immediate F (failing grade) in the course, regardless of circumstances, and will be reported to the Dean of Students office. For a flagrant violation, a student will immediately receive an F in the course and will be reported to the Dean of Students office.

Copying, sharing answers, or using disallowed materials during an exam is cheating, of course, and will result in an F in the course and a report to the Dean of Students office.

Students are allowed to work together on homeworks and labs. Students must however write their homeworks and labs individually. Again, copying on this course work is not allowed and

will result in a minimum penalty of a 0 for the submission plus a 5 percentage point penalty on the semester grade and a report to the Dean of Students office. Any student violating these academic honesty rules for a second time will receive an immediate F in the course and will be reported to the Dean of Students office. For a flagrant violation, a student will immediately receive an F in the course and will be reported to the Dean of Students office.

Refer to the Rensselaer Handbook of Student Rights and Responsibilities, which defines various forms of academic dishonesty and procedures for responding to them. Students found in violation of academic honesty policies will receive a failing grade (F) for the course.