22C:030 – Computer Science III
Spring 2002

Instructor: **Dr. Ramon Lawrence**
Class Schedule: 3:30 – 4:20 p.m. Monday/Wednesday/Friday
Location: W151 PBP (John Pappajohn Business Building)
Office Hours: 201L MacLean Hall - 1:30 – 2:30 MWF or by appointment
Phone: 335-0561
E-mail: ramon-lawrence@uiowa.edu (preferred contact method)
Course URL: http://www.cs.uiowa.edu/~rlawrenc/teaching/030/index.html

Course Description
This course is a continuation of 22C:020, and is required for all computer science majors and minors. The course deals with applications of software engineering techniques to the design and implementation of programs composed of complex data structures. Topics include manipulation of sets, files, stacks, lists, trees, symbol tables; searching and sorting; comparison of implementation techniques for data structures; analysis of program efficiency; and dynamically allocated data structures and recursion. The C++ and Java programming languages are used.

Prerequisite
- grades of C- or higher in 22C:016 and 22C:020

Marking and Evaluation
Homework Assignments   **15 %**   (approximately 1 every 2 weeks)
Programming Assignments   **25 %**   (4 to 6 assignments, one of which may be a project)
Exams   **60 %**

       Midterm #1   15 %   (non-cumulative, one hour)
       Midterm #2   15 %   (non-cumulative, one hour)
       Final Exam   30 %   (cumulative, two hours)

This course will use +/- grading. No late assignments will be accepted.

Textbook and Reference Material
Michael Main and Walter Savitch, *Data Structures and Other Objects Using C++ (second edition)*, ISBN 0-201-70297-5, 2001.

Teaching Assistants and Lab Sessions

Section	Lab Times and Location	TA Name	Office	Office Hours
A01	8:30 – 9:20 a.m. Tuesday 201 MLH	Jeevan Kodali	101J	TBA
A02	8:30 – 9:20 a.m. Thursday 201 MLH	**CANCELLED**		**CANCELLED**
A03	11:30 – 12:20 p.m. Tuesday 217 MLH	Imran Pirwani pirawni@cs.uiowa.edu	101B MLH	TBA
A04	11:30 – 12:20 p.m. Thursday 464 PH	Imran Pirwani	101B	TBA
A05	1:30 – 2:20 p.m. Tuesday 217 MLH	Jeevan Kodali jkodali@cs.uiowa.edu	101J MLH	TBA

Expectations

- I expect students to attend **all** classes and prepare before attending class. This includes reading relevant sections of the textbook and reviewing notes from previous lectures.
- I recommend all students download and read a copy of the lecture notes **before** the lecture.
- I expect all students to learn the material in the course and undertake sufficient effort to produce all of the homework and programming assignments.
- I want all students to enjoy attending class and feel free to participate according to their own personalities. Feel free to ask questions by raising your hand or speaking out at appropriate moments.
- Please actively participate in class discussions, questions, and problem solving exercises.
- **I want all students to pass the course, receive a good grade, and feel the course was beneficial.**

Grievances and Complaints Procedures

If you have any grievance or complaint about course direction, your treatment during class, your assigned marks, or any other problem, please first talk to your professor about the situation. I am very approachable and will work hard to ensure the course is enjoyable for you.

If there is a situation that cannot be resolved in this manner, please contact the Chair of the Department of Computer Science, Professor Steve Bruell, at 14D MacLean Hall, 335-1713.

Academic Dishonesty

A student must submit original work of his or her own construction. Academic dishonesty in the form of copying assignments, projects, or exams from other students or sources is not permitted. If you have any questions about what constitutes academic dishonesty, please contact your professor or consult the printed policy in the *Schedule of Courses* and the *CLAS Bulletin*.

Students with Disabilities

I would like to hear from anyone who has a disability that may require some modification of seating, testing, or other class requirements so that appropriate arrangements can be made. Please see me after class or during my office hours.

Missing an Exam

Only students who miss an exam for a reason that corresponds to the University of Iowa's policy on "Excused Absences from Examinations" will be permitted to take the exam at a later time. Please note that a make-up exam may have a question format that is different from the regular exam. You must complete an "Explanatory Statement of Absence from Class" form (available at the Registration Center) and present it to the professor for evaluation. If the reason for absence is satisfactory, the student may either take the exam, or if a midterm exam is missed, the midterm exam can be forfeited and the student's final exam will be worth more of the final grade.

Course Outline

The course has a substantial amount of material to be covered in a short time. This requires the student make a strong effort to keep up with the material discussed in class. It is especially important to work hard during the first month of classes during the transition from Java to C++. Below is an outline of the dates and topics covered, and initial exam dates. The professor is not bound to the topics, timelines, and outline provided as they only serve as a general reference.

Date	Topics Covered and Description
January 23 (W)	**First day of classes. Introduction to course, discuss syllabus**
January 25 (F)	Getting started with C++
January 28 (M)	Program specification, design, analysis and big-Oh notation (Sections 1.1-1.2)
January 30 (W)	Abstract Data Types and C++ classes (Sections 2.1-2.2)
February 1 (F)	Methods, parameters, and operator overloading (Sections 2.3-2.5)
February 4 (M)	Building a collection (bag) class (Section 3.1)
February 6 (W)	Building an ordered collection (sequence) class (Section 3.2)
February 8 (F)	**C++ pointers, new, and dynamic memory allocation** (Sections 4.1-4.2)
February 11 (M)	Implementing a collection class using a dynamic array (Section 4.3)
February 13 (W)	Linked lists (Section 5.1)
February 15 (F)	Linked list operations (Section 5.2)
February 18 (M)	Linked list applications and examples
February 20 (W)	Linked list review
February 22 (F)	Template classes (Sections 6.1-6.2)
February 25 (M)	Midterm #1 Review.
February 27 (W)	**Midterm Exam #1 in class.**
March 1 (F)	Standard template classes and iterators (Sections 6.3-6.5)
March 4 (M)	Stacks (Sections 7.1 & 7.3)
March 6 (W)	Arithmetic evaluation using stacks (Sections 7.2 & 7.4)
March 8 (F)	Queues (Sections 8.1-8.3)
March 11 (M)	Priority queues (Section 8.4)
March 13 (W)	Recursion (Sections 9.1-9.3)
March 15 (F)	Recursion on ADTs
March 18 - 22	**No classes. SPRING BREAK.**
March 25 (M)	Trees (Sections 10.1-10.2)
March 27 (W)	Tree traversals (Section 10.4)
March 29 (F)	Binary search trees (Section 10.5)
April 1 (M)	Game trees
April 3 (W)	Game trees (cont.)
April 5 (F)	Heaps (Section 11.1)
April 8 (M)	Midterm #2 Review.
April 10 (W)	**Midterm Exam #2 in class.**
April 12 (F)	B-trees (Section 11.2)
April 15 (M)	B-trees (cont.)
April 17 (W)	Review of trees.
April 19 (F)	Searching (Section 12.1)
April 22 (M)	Hashing (Section 12.2)
April 24 (W)	Chained hashing (Section 12.3)
April 26 (F)	Quadratic sorting algorithms (Section 13.1)
April 29 (M)	Mergesort (Section 13.2)
May 1 (W)	Quicksort (Section 13.2)
May 3 (F)	Heapsort (Section 13.3)
May 6 (M)	Sorting review and STL sorting (Section 13.4)
May 8 (W)	ADT and algorithm applications
May 10 (F)	Final exam review.
Final Exam Week	**Final Exam Date TBA**