CSA-220: Computer Science II

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1 Overview

1.1 Catalog Description

"Data structures and concepts of object-oriented programming. The C++ programming langauge. User defined data types, data abstraction and classes. Lists, stacks, queues, trees, and their implementations."

1.2   Prerequisites

The official prerequisite is CSA-120 or the equivalent.

Given that we are in a time of transition for the Computer Science programs among the College of Arts & Science and Parks, I expect that students are entering this course with varying backgrounds. Please make sure to fill out our online questionnaire to describe your background.

1.3   Detailed Description

Computer Science II is an undergraduate course which is a follow-up to Computer Science I (CSA-120). The goal of Computer Science I can be viewed as gaining the ability to write computer programs for accomplishing tasks. The key in that course was that programs must work *correctly* for the task at hand. In this course, we will focus on the fact that there are actually many different ways to correctly solve a particular problem and that these different methods may vary greatly in *efficiency* and *adaptability*.

What we will find is that writing a "good" program is not as simple as starting with a correct program and then improving it. Instead, the quality of a program is most determined by key thoughts and decisions which take place long before the first line of code might be written. Relevant issues include the choice of data structures which are used to organize all of the information within a program, and the structure and level of generality which allow components of a program to be better maintained, reused, and adapted.

In hand with this emphasis on writing good programs and designing useful data structures, the course will introduce the paradigm of *object-oriented programming* and the C++ programming language.

2   Course Administration

2.1   The Staff

Instructor:	Dr. Michael Goldwasser
Email:	goldwamh@slu.edu
Web:	http://euler.slu.edu/~goldwasser/
Office:	Ritter Hall 006
Telephone:	(314) 977-7039
Office hours:	Mondays 9:15–10:15am
	Tuesdays 10:45–11:45am
	Thursdays 2:30–3:30pm
	or by appointment

Please make sure to take advantage of office hours, as they offer a wonderful opportunity for individual attention.

2.2   Class Meetings

The Lectures

The material will be presented in two weekly lectures. Though attendance in class is not explicitly required, it is certainly expected. Lectures are designed to be interactive and class participation is most welcome. These meetings will offer learning opportunities that cannot be recreated purely from readings. That said, for those who miss a lecture, copies of lecture notes can be found on the course schedule web page.

Time:	Tuesday/Thursday, 9:30–10:45am
Place:	Ritter Hall 316

2.3   Textbook

The required textbook for this course is:

Title:	*Data Structures and Algorithms in C++*
Authors:	Michael T. Goodrich, Roberto Tamassia, and David M. Mount
Publisher:	John Wiley & Sons, 2004
ISBN:	0-471-20208-8
Website:	`cpp.datastructures.net`

The text should be available through the campus bookstore as well as various online book vendors.

3   Online Resources

This course will take advantage of the Internet and the departmental network in many ways.

3.1   CSA-220 Web Page: `euler.slu.edu/~goldwasser/csa220`

With the exception of the first day's printed handouts, most of the information for this course will be distributed only by means of the course web page. This web site will contain all assignments, a schedule of lectures, detailed lecture notes and links to many other sources of information.

The web page contains some information (e.g. solutions, submitted assignments, individual grades) which is more sensitive and therefore which will be available to students in the class only after they have identified themselves properly. To gain access to these parts of the web page, a student must first complete an online questionnaire, creating a unique identity and password.

3.2   Electronic Assignment Submission

All assignments for this course must be submitted electronically! The submission procedure will be done through the course web page, and allows students to submit from any computer connected to the Internet. Each student in this class will be selecting a unique username/password combination solely for use in identifying the student when using the course web page. Details of the procedure are discussed at: `euler.slu.edu/~goldwasser/csa115/submit/`

3.3   Email with Instructor

Face-to-face contact in class and in office hours is most desirable. Yet email is a convenient form of communication as well. I try to respond to email promptly, including at least once each evening when possible.

4   Graded Work

4.1   Homework Assignments (20%)

We expect there to be a total of 8 written homework assignments during the course, each of which involves some amount of work on a computer. At the end of the semester, **we will throw away your lowest of the eight grades,** with the remaining seven assignments contributing to this portion of the grade.

These will generally be due at the beginning of class on the assigned due date. The problems will consist of short questions reinforcing the material in the lectures, readings labs and programs. Each homework will contain one or more practice problems which are not to be turned in and which can be discussed freely between classmates. The problems which are to be submitted for a grade, however, must be done entirely individually. A more complete explanation of our policy towards Academic Integrity is given in Section 4.6.

4.2   Programming Assignments (40%)

We expect there to be a total of 8 programming assignments during the course. At the end of the semester, **we will ignore your lowest of the eight grades,** with the remaining seven assignments contributing to this portion of the grade.

On certain assignments, you will be required to work individually; on others you will be allowed to work in pairs. Early in the course you will have approximately one week for each assignment; later in the course you will often have two weeks. The assignments will be submitted electronically and generally due at 8pm on the assigned due date.

You will note that almost half of your course grade is being determined by these assignments. This reflects the great amount of time and effort which you

will be putting forth in completing these assignments. When completing this work, please respect the policy on Academic Integrity as given in Section 4.6.

4.3 Exams (40%)

- **First Exam (10%)**, Thursday, 30 Sep 2004, 9:30–10:45 a.m
- **Second Exam (10%)**, Thursday, 4 Nov 2004, 9:30–10:45 a.m
- **Final Exam (20%)**, Tuesday, 14 Dec 2004, 8:00–9:50am

4.4 Extra Credit

Both homework and programming assignments will generally include a small extra credit challenge. Please notice, however, that the actual extra credit given for these challenges is relatively insignificant. Students who are seriously concerned about improving their overall grade would be best advise to focus all efforts on doing as well as possible on the required work and in preparing for exams.

Our true reason for including these opportunities is to provide some fun and encouragement for students who wish to dig a bit deeper than was required in an assignment. For those students, the chosen extra credit challenges provide a good next step.

4.5 Course Grades

Letter grades will be based on each students overall percentage of awarded points according to the following formula.

Student percentage above 85% will result in a grade of A   or better.
Student percentage above 78% will result in a grade of B+ or better.
Student percentage above 70% will result in a grade of B   or better.
Student percentage above 65% will result in a grade of C+ or better.
Student percentage above 60% will result in a grade of C   or better.
Student percentage above 50% will result in a grade of D   or better.
Student percentage below 50% will result in a grade of F.

Any modification to this scale at the end of the year will be *in favor of the students*. That is we may later decide to award an A to a student who is slightly below the above cutoff, but we certainly will not deny an A from someone who is above the cutoff.

4.6   Academic Integrity

Students are expected to have read and abide by the University statement on Academic Integrity available on page 56 of the Saint Louis University's Undergraduate Catalog. The College of Arts & Science provides a more detailed policy statement, at `http://www.slu.edu/colleges/AS/academichonesty.html`, which applies within the College and thus to this course.

In addition to those general statements, we wish to discuss our policy in the context of this course. When it comes to learning and understanding the **general course material**, you may certainly use other reference materials and you may have discussions with other students in this class or other people from outside of this class. This openness pertains to material from the text, practice problems, general syntax and use of the C++ language or other computing tools.

However, when it comes to **work which is submitted for this course**, you are not to use or to search for any direct or indirect assistance from unauthorized sources, including but not limited to:

- other students in this class
- past students, whether from this school or other schools
- other acquaintances
- other texts or books
- online information other than that referenced by course materials

Acceptable sources of information include consultations with the instructor, teaching assistants, or members of organized tutoring centers on campus, as well as any materials explicitly authorized in an assignment. Even in these cases, if you receive significant help you should make sure to document both the source of the help as well as the extent.

On certain programming assignments, we will explicitly allow students to work in pairs. In this case, conversations between partners is both permissible and required. Furthermore, both students are expected to contribute significantly to the development of the submitted work. It is unethical to allow a partner to "sign on" to a submission if that partner did not significantly contribute to the work.

Any violations of these policies will be dealt with seriously. Penalties will apply as well to a student who is aiding another student. Any such violations will result in a minimum penalty of a zero on the given assignment which cannot be dropped, and severe or repeated violations will result in an immediate failing grade in the course. Furthermore all incidents will be reported in writing to the Department and/or the Dean, as per the College procedure.

4.7 Late Policies

All exams must be taken promptly at the required time. Requests for rescheduling an exam will only be considered if the request is made prior to the start of the exam, or else in an "emergency" situation with appropriate documentation.

For both written and programming assignments, we wish to allow students to continue to work comfortably beyond the official deadline when a little more time will result in more progress, while at the same time discourage students from falling significantly behind pace and jeopardizing their success on future assignments. Our solution is the following exponentially decaying late formula (some have suggested that we should offer extra credit to anyone who fully understands this formula).

We will consider an assignment submission "complete" when any part of the assignment is last submitted or modified. Any assignment which is not complete promptly by its due date and time will be assessed a penalty based on the formula $S = R \cdot e^{-h/173}$, where S is the grade given, R is the grade the work would have received had it been turned in on time, and h is the amount of time (in hours or fractions thereof) that the work was late. Examples:

— work turned in 1 hour late receives over 99.6% of its original credit
— work turned in 5 hours late receives over 97% credit
— work turned in one full day late receives less than 88%
— work turned in two full days late receives less than 76%
— work turned in five days late receives less than 50%

The above policies will be waived only in an "emergency" situation with appropriate documentation.

5   Additional Information

5.1   Students with Disabilities or Special Needs

In accordance with the Americans with Disabilities Act, reasonable accommodations may be made to assist a student with a documented disability.

Any student who feels that he/she may need academic accommodations in order to meet the requirements of this course, as outlined in the syllabus, due to presence of a disability, should contact the Office of Diversity and Affirmative Action. Please telephone the office at 314-977-8885, or visit DuBourg Hall Room 36. Confidentiality will be observed in all inquiries.