

# CS49995 – Generic Programming and Library Design

## ***News and Info***

This is the syllabus for this course. The course web page is found at:

<http://www.cs.kent.edu/~asutton/fall08/gpld>

Note that the syllabus is subject to change over the course of the semester. The most recent version will be posted online. Also note that the course schedule will also be posted on this website.

## ***Instructor***

### **Andrew Sutton**

|              |   |
|--------------|---|
| Office       | MSB 152   |
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| Email        | <a href="mailto:asutton@cs.kent.edu">asutton@cs.kent.edu</a>                  |
| Web Page     | <a href="http://www.cs.kent.edu/~asutton">http://www.cs.kent.edu/~asutton</a> |
| Office Hours | Mon, Wed 1:45-2:45  |

## ***Course Description***

This is a senior/master's level course that focuses on generic programming using C++ and the design and construction of generic libraries. This course will teach students how to build generic data structures and algorithms using advanced C++ features such as templates, metaprogramming, and concepts. Students will also learn how to work with and construct their own generic libraries. This class will also introduce new features of the next version of C++ such as variadic templates and move semantics. Students will also learn to use common development tools to support their programming including, compilers, build tools, debuggers, profilers, memory checkers, and documentation tools. Specific topics covered will include (in no particular order and preliminary):

- Templates
- Concepts
- Template metaprogramming
- Generic programming
- Generic design patterns
- Library design
- The Standard Template Library
- The Boost C++ Libraries
- Programming tools

## ***Prerequisites***

Requires: CS330001 (Data Structures)

Preferred: CS33101 (Programming Languages), CS4601 (Algorithms), CS43901 (Software Engineering)

## ***Text***

|              |   |
|--------------|---|
| Alexandrescu | Modern C++ Design: Generic Programming and Design Patterns Applied (required) |
| Abrahams     | C++ Template Metaprogramming: Concepts, Tools, and Techniques (recommended)   |
| Austern      | Generic Programming and the STL: Using and Extending the C++ (recommended)    |

## ***Homework***

Homework in this course will be designed to reinforce the lecture material through programming. The homework assignments may build on previous assignments so it is very important to keep current. Some assignments may also require documentation or written descriptions of alternatives.

All homework must be done individually and will be submitted using the Subversion version control system. Homework must be written according to the coding standard, be thoroughly documented, and use the specified build system.

Credit will not be given for programs that either do not compile or compile with warnings. No credit will be given for late assignments.

There will be between 4 and 7 programming assignments.

## ***Project***

Students will be required to complete a group project (groups of 2-3, tentatively). Each group will be required to implement a generic library in some application domain. The library must be fully documented, and tested and must be presented at the end of the semester. Groups will be able to choose their own projects, subject to approval.

## ***Exams***

There will be one midterm exam and one cumulative final exam, which will cover material covered in both the lecture.

Makeup exams will not be given unless you have university-approved excuse (generally, any documented reason such as a doctor's note). If you cannot be there the day of the exam, please arrange to take the test on a different day in advance. I make no guarantee that a makeup exam will be the same as or even similar to the original.

## ***Grading***

Your grade in the class is determined by the ratio of earned points to the total. The breakdown of percentages is given in the table below.

| <b>Component</b> | <b>Percentage</b> |
|------------------|-------------------|
| Homework         | 25%               |
| Project          | 25%               |
| Midterm          | 25%               |
| Final            | 25%               |

Note: These percentages will probably change over the course of the semester.

Letter grades will be given according to the following percentages:

| <b>Letter Grade</b> | <b>Percentage</b> | <b>Points</b> |
|---------------------|-------------------|---------------|
| A                   | 93 - 100%         | 4.0           |
| A-                  | 90 - 93%          | 3.7           |
| B+                  | 87 - 90%          | 3.3           |
| B                   | 83 - 87%          | 3.0           |
| B-                  | 80 - 83%          | 2.7           |
| C+                  | 77 - 80%          | 2.3           |
| C                   | 73 - 77%          | 2.0           |
| C-                  | 70 - 73%          | 1.7           |
| D+                  | 67 - 70%          | 1.3           |
| D                   | 60 - 67%          | 1.0           |
| F                   | < 60%             | 0.0           |

## ***Policies Regarding the Evaluation of Your Work***

It is up to the student to make up any missed material. Make-ups will only be given in the case of an excused absence or a documented, valid emergency. This includes tests and homework. I encourage you to contact me if an emergency arises.

Copying or plagiarism of any type will not be tolerated and will be dealt with in accordance to Kent State University's policy on cheating and plagiarism described in the student handbook. You should read the Department's policy on this issue:

<http://www.cs.kent.edu/programs/grad/studentinfo.html#dishonesty>

Cheating and plagiarism constitute fraudulent misrepresentation for which no credit can be given and for which appropriate sanctions are warranted and will be applied.

**"Cheat"** means intentionally to misrepresent the source, nature, or other conditions of academic work so as to accrue undeserved credit, or to cooperate with someone else in such misrepresentation. Such misrepresentations may, but need not necessarily, involve the work of others. As defined, cheating includes, but is not limited to:

- Obtaining or retaining partial or whole copies of examination, tests or quizzes before these are distributed for student use;
- Using notes, textbooks or other information in examinations, tests and quizzes, except as expressly permitted;
- Obtaining confidential information about examinations, tests or quizzes other than that released by the instructor;
- Securing, giving or exchanging information during examinations;
- Presenting data or other material gathered by another person or group as one's own;
- Falsifying experimental data or information;
- Having another person take one's place for any academic performance without the specific knowledge and permission of the instructor;
- Cooperating with another to do one or more of the above; and
- Using a substantial portion of a piece of work previously submitted for another course or program to meet the requirements of the present course or program without notifying the instructor to whom the work is presented.
- Presenting falsified information in order to postpone or avoid examinations, tests, quizzes, or other academic work.

**"Plagiarize"** means to take and present as one's own a material portion of the ideas or words of another or to present as one's own an idea or work derived from an existing source without full and proper credit to the source of the ideas, words, or works. As defined, plagiarize includes, but is not limited to:

- The copying of words, sentences and paragraphs directly from the work of another without proper credit;
- The copying of illustrations, figures, photographs, drawings, models, or other visual and nonverbal materials, including recordings, of another without proper credit; and
- The presentation of work prepared by another in final or draft form as one's own without citing the source, such as the use of purchased research papers.

## ***Registration Requirement***

The official registration deadline for this course is September 7, 2008. University policy requires all students to be officially registered in each class they are attending. Students who are not officially registered for a course by published deadlines should not be attending classes and will not receive credit or a grade for the course. Each student must confirm enrollment by checking his/her class schedule (using Student Tools in FlashFast) prior to the deadline indicated. Registration errors must be corrected prior to the deadline.

### ***Students with Disabilities***

University Policy 3342-3-01.3 requires that students with disabilities be provided reasonable accommodations to ensure their equal access to course content. If you have a documented disability and require accommodations, please contact the instructor at the beginning of the semester to make arrangements for necessary classroom adjustments. **Please note, you must first verify your eligibility for these through Student Accessibility Services** (contact 330-672-3391 or visit [www.kent.edu/sas](http://www.kent.edu/sas) for more information on registration procedures).