CSE 30331 - Data Structures
Syllabus - Fall Session 2007

Time and Location:  Tues & Thurs 9:30-10:45am  356 Fitzpatrick Hall
Instructor:  Paul R. Brenner, PhD, P.E.
brenner.6@nd.edu

Course Description:

The student who completes this course will have a sound understanding of many of the fundamental data structures that lie at the heart of computer science. Students will learn and implement fundamental techniques in the design and analysis of data structures as abstract data types (ADTs). Example fundamental data structures include: lists, stacks, queues, strings, vectors; and more advanced structures such as deques, priority queues, hash tables, graphs, and trees. For selected ADTs sorting, searching, and string processing algorithms will be discussed with respect to their asymptotic complexity and functionality. Program specification, design, and testing will be emphasized using an object oriented approach. The C++ Standard Template Library (STL) will be referenced and used throughout. The course will conclude with introduction of applied topics in data, specifically databases, data mining, and data visualization.

Goals of Course:

1. Learn the fundamentals of the generic vector, list, stack, queue, and priority queue containers supplied by the Standard Template Library. Learn select advanced data structures as implemented in the BOOST C++ libraries.
2. Understand and use ADTs and APIs.
3. Develop object-oriented software engineering skills including user specifications, software design methods, implementation, and testing.
4. Develop problem solving skills with a focus on appropriate selection of data structures based on desired functionality and computational complexity.
5. Understand basic concepts in databases, data mining, and data visualization.

Textbook:  Data Structures with C++ using STL, 2nd Edition; Ford & Topp, Prentice Hall 2002

Optional References:

Data Structures and Algorithms in C++, 3rd Edition; Adam Drozdek, Thomson 2005

Introduction to Algorithms, 2nd Edition: Cormen, Leiserson, Rivest, & Stein, MIT Press 2001 -- *free online version available

The C++ Standard Library-A Tutorial & Reference; N. Josuttis, Addison-Wesley 1999

Online Resources:  http://oit.nd.edu/concourse/index.shtml
Expectations:

Students are expected to finish assigned readings prior to class. Students will be responsible for both the material in the text and the material covered in class. Students will show mutual respect for each other and the instructor at all times. Disruptive, dishonest, or inappropriate behavior will not be tolerated. All absences should be discussed with the instructor ahead of time. Students are welcome and encouraged to discuss all course relevant concerns with the professor.

Notre Dame and CSE Policies:

This course will be taught according to all ND and CSE policies (Honor Code, Students with Disabilities, Sexual Harassment, etc…). Please contact the instructor with any questions or concerns.

Evaluation Standards: Homework, Programming Assignments/Project, Exams

Evaluation Methods: \((A,A-) \geq 90\%, (B+,B,B-) \geq 80\%, (C+,C,C-) \geq 70\%, (D+,D,D-) \geq 60\%\)

Grading and Evaluations:

<table>
<thead>
<tr>
<th>Participation</th>
<th>5%</th>
<th>Midterm Exam</th>
<th>20%</th>
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<tbody>
<tr>
<td>Homework</td>
<td>20%</td>
<td>Final Exam</td>
<td>25%</td>
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<tr>
<td>Programming</td>
<td>30%</td>
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Late Assignments and Make-up Exams:

All submissions will be via electronic dropbox which will be closed at 5pm on the due date. Late assignments will receive a 25% penalty and no assignments will be accepted more than one day late. Make-up exams will be given ONLY if prior arrangements have been made with the instructor or an official notice is received from the University (medical, etc…)

Office Hours:

**Instructor**
Paul Brenner, PhD
pbrenne1@nd.edu
Tues-Thurs 11am-12, 5-6pm
3rd Floor Fitzpatrick Carrels

**Graduate TA**
David Salyers
dsalyers@nd.edu
MWF 4-6pm
Cushing 214

**Graduate TA**
H. Bui
hbui@nd.edu
Tues, Thurs 2-5pm
Cushing 222

Exam Schedule (approximate):

Midterm – Tues October 9th in class.
Final Exam – Per Registrar