CS 300 DATA STRUCTURES AND ALGORITHMS

SPRING 2011 Syllabus

Class Time: Tuesday, Thursday 11:00 am – 12:15 pm
Class Venue: WH 310

Required or Elective Required for the BSCE and BSCS degrees; elective for the BSEE degree.

Catalog Description Basic data structures and associated algorithms. Includes structures such as array lists, linked lists, stacks, queues, binary trees and hash tables. Analyzes algorithms for efficiency and correctness.

Prerequisite CS 211

Prerequisite Expectations by Topic The student must have an adequate background in the following areas:

• The knowledge of the basic elements of the C programming language.
• The ability to read and write algorithms for solving simple application problems.
• The understanding of top-down modular program development.
• The ability to understand and correct syntax errors generated by a compiler.
• The ability to diagnose and correct logic errors in computer programs.

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Course Objectives After successful completion of this course, students will have demonstrated the following abilities:

• The knowledge of basic data structures, and their associated algorithms.
• Knowledge of the run time efficiencies of the basic algorithms.
• The ability to develop algorithms, which involve the use of basic data structures to solve application problems.
• The ability to write large-scale top-down modular programs which span two or more files.
• Knowledge of dependency charts and the use of makefiles for large-scale programs.
**Format and Grading Percentages**  Primarily lecture based class. There will be 4 – 5 home works, 4 – 5 programming assignments, and three exams.

**Exams**  50%
- Test 1: 15 points;
- Test 2: 15 points;
- Test 3 (COMPREHENSIVE): 20 points;

**Home Works**  20%
- One homework per major topic
- Each submission has equal weight

**Programming Assignments**  30%
- Each submission has equal weight

The following approximate scale would be used to determine letter grades (grade would be curved based upon class average):
- A = 90 % to 100 %
- B = 80 % to 89 %
- C = 70 % to 79 %
- D = 60 % to 69 %
- F < 60 %

**Exam Schedule**  Since the exams will be held during class hours, you should not have any conflicts. However, if you do have a scheduled conflict for the exam period, see the instructor. There will be NO make-up exams. All exams will be closed book/notes, and will be time constrained. Exams will typically consist of logical and quantitative problems, modeling and design questions, multiple choice (true-false) questions, and short answer questions and will focus on concepts. Tests 1 and 2 will cover the material covered until the previous lecture before the test. Test 3 will be comprehensive, but it will place extra emphasis on incremental material covered since the previous exam.

**EXAM DATES:**
- Test 1: Feb 24th, 2011 (15%)
- Test 2: Mar 31st, 2011 (15%)
- Test 3: May 5th, 2011 (20%, Comprehensive)
**Topics Covered**

- A review of data structures and pointers; dynamic memory allocation.
- Linear list implementation using array lists.
- Linear list implementation using linked lists.
- Stacks implemented as array lists.
- Stacks implementation as linked lists.
- Queues implemented as array lists.
- Queues implementation as linked lists.
- Prefix and postfix notation.
- Recursion.
- Binary trees and traversals.
- Binary search trees.
- Hash tables and hashing algorithms.

**Tentative List of Chapters Covered (from text book)**

- Pseudo-code and Algorithms: Chapter 1
- Recursion: Chapter 2
- Stacks: Chapter 3
- Queues: Chapter 4
- Linked Lists: Chapter 5
- Binary Search Trees: Chapters 6, 7
- Hash Tables: Chapter 13
- Graphs (Time Permitting): Chapter 11
- Sorting (Time Permitting): Chapters 12

**Class Schedule**  Number of sessions: 2 lectures each week (for 15 weeks). Duration of each lecture: 75 minutes. Three in-class exams take three of the 75 minute lecture periods.

**Laboratory Schedule**  Number of sessions: 1 meeting each week (for 15 weeks). Duration of each laboratory session: 75 minutes.

**Computer Account Security and Use**  Each student should practice proper security measures on his or her computer account. Never give your password to anyone. Allowing others access to a class account or to files and directories is the same as giving them the information directly and will be dealt with in like manner. Any trouble with an account should be referred to the instructor as soon as possible. When a program has been submitted, save your final version until after the program has been graded, just in case some problem occurs and the grader needs a fresh copy of your submitted work.
General Policies

- The exams and home works will be based upon lectures and required reading.
- Our policy will be to return graded material within one week of handing it in. All issues regarding graded material should be resolved within one week of the date graded material is returned. Any graded material that is not picked up within two weeks will be discarded.
- All home works and other submissions must be submitted by the indicated deadline. Submissions after the deadline will not be graded. Exceptions will require a valid and documented reason. There will be no make-ups for home works.
- Blackboard would be used extensively for course materials, assignments and grades.
- Late submission of programming assignments may be allowed with 25% penalty, until the next class meeting after the submission deadline. You need to inform the instructor if you plan to submit the programming assignment late.
- Home works and other assignments will clearly state where, how and by when to submit your assignment. Late submissions are not accepted (except for programming assignments, as mentioned above). Submissions over email are not accepted, and would be discarded.
- Exam dates will not be changed (including final exam).
- **Academic Honesty**: Please refer to the university’s academic honesty statements. While it is encouraged to interact with your colleagues, your submissions must be only your own work. Issues of academic dishonesty will be dealt with severely.
- No cheating will be tolerated. Giving or receiving aid from others during exams or copying homework and programs will result in failing the course.

Other Policies

- Programming assignments need to be turned in on the network.
- Programming assignments need to be turned in by the due date, and are due when the lab closes.
- The instructor reserves the right to assess partial credit for assignments that do not meet the required criterion.
- If you are absent from class, you are still responsible for submitting your assignments on time.
- Students are expected to attend all class sessions, and to be on time.
- Students are responsible for catching up with the class when they miss a session. The material that is taught in this course is cumulative.

The instructor reserves the right to make reasonable changes to the syllabus, schedule of class meetings, and assignments if necessary.