

SYLLABUS

Spring 2011

CSC 260 Data Structures and Algorithms

4 cr.

Prerequisites: CSC 200A, and CSC 202J with grade of C+ or higher.

Instructor: Beifang Yi
email: byi@salemstate.edu

Office: MH 208D
Hours: TR(2-5:00), WF (12:00-1:00)

Phone: (978) 542-7426
Web Site: http://cs.salemstate.edu/~b_yi/

Section	Time	Room	Final Exam
01	T & R 12:30-1:45pm	MH 303	Monday, 5/9, 11:00am-1:00pm MH 303
L21	T & R 11:00-12:15pm	MH 202	

Catalog description:

Basic data structures such as stacks, queues, linked lists, and trees are studied and applied to problems in data storage and manipulation. Applications include basic searching and sorting algorithms. Design, analysis and implementation techniques are discussed. Three lecture hours and three hours of scheduled laboratory per week, plus extensive programming work outside of class.

Prerequisites: CSC 200A, and CSC 202J with grade of C+ or higher.

Goals:

The purpose of this course is to develop students' knowledge and appreciation of organization and retrieval techniques and to familiarize students with the basic concepts of order-of-magnitude analysis. The goals of this course are:

- CG01: to develop an appreciation for the process of data abstraction and its usefulness in software development;
- CG02: to develop the skills and knowledge necessary to perform basic analysis of algorithms;
- CG03: to present a selection of the most common data structures and their standard implementations and uses;
- CG04: to present a selection of the most common algorithms for searching and sorting.

Objectives:

Upon successful completion of the course, student will have:

- CO01: applied data abstraction techniques;
- CO02: implemented several classic data structures "from scratch";
- CO03: demonstrated knowledge and use of ADTs available in one or more language libraries;
- CO04: recognized the factors required to perform analysis of algorithms and performed order-of-magnitude analysis;
- CO05: chosen, with justification, an appropriate structure to match the requirements of a given problem, implemented the structure if necessary, and used it in an appropriate way to solve the problem;
- CO06: utilized standard techniques for program validation;
- CO07: demonstrated the ability to use the UML modeling language;
- CO08: produced documentation for at least one major completed project, including formal class diagrams and rigorous test set specification and results.
- CO09: participated in at least one group project involving problem analysis and design specification and selection
- CO10: demonstrated recognition of the need for future professional development through research into future trends in the areas of analysis of algorithms and application development and profiling.

Course Topics:

A detailed topics list and a general course bibliography can be found on the Computer Science Department website at http://cs.salemstate.edu/dept/uploads/2_CSC260withBoK1.pdf. The course provides a basic understanding of data structures, related processing algorithms and their implementations in object oriented programming languages. These concepts are presented through the use of the programming language Java and its packages.

Text:

(Required) Java Software Structures: Designing and Using Data Structures, 3rd Ed., by J. Lewis, J. Chase., Pearson Education, 2010, ISBN-10: 0-13-607858-3, ISBN-13: 978-0-13-607858-6.

Required Material:

(Required) Thumb (flash) drive, 2 GB minimum

Software:

J2SE 6.0 and NetBeans 6.8 (this is the only IDE that will be covered in class). Free copies of the software can be downloaded in the Department labs - instructions will be given in class.

Cell phones:

Turn the ringer off, or, better yet, *turn the phone off*.

Lecture Attendance:

Class policy is that of the Registrar's office - see the University catalog for details. Lecture will start promptly at the scheduled time, so please make a serious effort to not be late; if you *have* to be late, please be discrete when entering the classroom. While class attendance does not *directly* affect your final grade, some of the material covered in class is not found (in the same form) in the text, so class attendance and notes are very important. Note that you are at all times responsible for materials and assignments discussed in class: if you miss a class, try to get lecture notes from a classmate and review them **before** the next lecture, and **check your email or visit course homepage** (http://cs.salemstate.edu/~b_yi/2011Spring/CSC260/index.html) **for any materials that may have been distributed**. Each student is responsible for completing all course requirements and for keeping up with all that goes on in the course (whether or not the student is present).

Quizzes will be held in class lecture hours.

Scheduled Lab Attendance:

Attendance during lab time is **STRONGLY recommended**. Lab will be used to review or present software tools, to discuss and investigate Java implementation details that time may not permit to be fully explored during the scheduled lecture period, for design and implementation drills, for occasional short lab (programming) exercises, to assist with design and debugging problems that arise in longer lab / project exercises, and to check/examine/grade the exercises and homework.

Final Grade:

Final grade will be determined using the following grading weights:

assignments (labs, projects, and other exercises)	50%
quizzes	10%
midterm examination	15%
final examination	25%

Attendance is not used to calculate the final grade: however, note that you are at all times responsible for assignments and materials presented in class.

The following table shows how the course work is assessed against the course objectives:

	Quizzes/Exams	Assignments (labs, programming projects, and other exercises)
CO01	✓	✓
CO02	✓	✓
CO03	✓	✓
CO04	✓	✓
CO05	✓	✓
CO06		✓
CO07	✓	✓
CO08	✓	✓
CO09		✓
CO10		✓

Assignments (Labs / Projects/Other Exercises):

There will be different types of assignments: labs, programming projects, short-answer questions, and written assignments. *Most will have pre-lab activities to be completed prior to the implementation of the assigned tasks while a few will be in the form of short answer.* Most of the exercises will definitely require **significant** programming time outside of scheduled lab. Submission requirements and mechanics will be stated on each exercise.

Each assignment will have an assigned due date and time. Assignments submitted late will be penalized (see **Submission Deadlines / Late Penalties** below).

Each assignment may have different full scores, depending on the difficulty and the amount of the work of the exercises. There will be one or two extra assignments given in the semester and these extra assignments will be used as make-up assignments. Any assignment may be used as the extras. The average score for the overall assignments will be the total scores received for all the assignments divided by the total scores of the required assignments. The maximum score for the assignment is 100%, that is, 50 points of the final grade.

(There will be Challenging Programming Projects, which will be graded separately. No late submission of these projects will be accepted. Grades earned from these Challenging Programming Projects will be added to the final grade.)

Assignments are the most important part of the course work; practice with and fulfillment of the assignments will greatly help the quizzes and exams. Assignment is worth 50% of the final grade.

Exams/Quizzes:

There will be two exams, a midterm (usually in week 8) examination and a *comprehensive* final examination. There will be about 6 to 10 quizzes to be held in class lecture hours (one quiz with the lowest grade will be dropped from the final grading/scoring).

Please refer to Final Grade above for the grading weights of the exams and quizzes.

Missed Tests:

Tests (exams and quizzes) may not be made up except for *documented emergency* situations. If a test must be made up, arrangements must be made with the instructor to take the test before it is discussed in class (usually within a week of the test being administered).

Student-Teacher Communication:

Learning how to design and implement data structures with a programming language is very much a **hands-on, experiential process** - the only way to be sure that you understand the material is to apply it by designing and writing programs.

If you have any questions regarding course material, and *in particular if you are having problems with a programming project*, the most effective way to get assistance is to **discuss with the instructor (either in the class or outside the classroom)**. If you want to send the instructor an email about the problem, use the Subject line to succinctly state the problem/question, use the body of the email to describe in as much detail as possible what you need assistance with, and (if the problem relates to a Java project) attach a zip archive containing the

entire project to the email.

Submission Deadlines / Late Penalties:

- **Any assignments submitted after 5/4/2011 will receive ZERO.**
- **All other** late submissions will be penalized according to the following table.
- (If you cannot submit your work because of unexpected situations, please contact the instructor ASAP for extended submission time—usually upon documented notice.)

Amount of Time Being Late	Deduction
(1 second, 2 days]	10%
(2 days, 1 week]	30%
(1 week, 3 weeks]	50%
(3 weeks, ∞)	100%
Any assignments submitted after 5/4/2011	100%

Study Groups:

While I strongly encourage study groups, for non-group assignments I require that each student hand in his/her answers in his/her own words - **if two answers come out exactly the same or highly similar, neither will receive credit and/or further actions will be taken** (such as reporting to the department and/or university). Given the nature of most of the projects, homework questions and writing assignments, it will be almost impossible for two people to come up with highly similar answers UNLESS they copy.

Academic Integrity:

Academic Integrity Policy and Regulations can be found in the University Catalog and on the University's website ([http://www.salemstate.edu/content_images/academic_integrity_regulations_2007\(1\).pdf](http://www.salemstate.edu/content_images/academic_integrity_regulations_2007(1).pdf)). The formal regulations are extensive and detailed - familiarize yourself with them if you have not previously done so. A concise summary of and direct quote from the regulations: "Materials (written or otherwise) submitted to fulfill academic requirements must represent a student's own efforts". *Submission of other's work as one's own without proper attribution is in direct violation of the University's Policy* and will be dealt with according to the University's formal Procedures.

"Salem State College is committed to providing equal access to the educational experience for all students in compliance with Section 504 of The Rehabilitation Act and The Americans with Disabilities Act and to providing all reasonable academic accommodations, aids and adjustments. Any student who has a documented disability requiring an accommodation, aid or adjustment should speak with the instructor immediately. Students with Disabilities who have not previously done so should provide documentation to and schedule an appointment with the Office for Students with Disabilities and obtain appropriate services."

In the event of a university declared critical emergency, Salem State University reserves the right to alter this course plan. Students should refer to <http://www.salemstate.edu> for further information and updates. The course attendance policy stays in effect until there is a university declared critical emergency. In the event of an emergency, please refer to the alternative educational plans for this course located at http://cs.salemstate.edu/~b_yi/2011Spring/CSC260/emergency/index.html. Students should review the plans and gather all required materials before an emergency is declared.

Please remember that if, for any reason, you decide to drop this course, you **MUST** do so officially through the Registrar's office. The last day to withdraw from a course this semester is **Friday, April 15th, 2011.**

Note: This syllabus represents the intended structure of the course for the semester. If changes are necessary, students will be notified in writing and via all regular class communication mechanisms (class discussion, emails, and/or the course homepage through the instructor's website at http://cs.salemstate.edu/~b_yi/).