

COMS223-41**Data Structures**

Credits:	3 (Lab required)	Pre-req: COMS115 or COMS143
Time/Location:	Wed 6-9:40pm / B315	
Instructor:	Geoffrey J. Cullen email: gcullen@sussex.edu (only acceptable email contact) website: http://cullenprogramming.homelinux.com/profnotes.html Google: cullen programming	
Office Hours:	You may make an appointment or see me immediately before class or after class in the lab (preferred).	
Text:	“Data Structures using JAVA”, Langsam, Augenstein and Tenebaum ISBN-10:0130477214 ISBN-13:978-0130477217 or “Data Structures using C+ +”, Langsam, Augenstein and Tenebaum ISBN-10:0130369977 ISBN-13:978-0130369970	
Supplemental:	Fundamental Algorithms, D. Knuth, publisher: Addison-Wesley (optional)	
Required Supplies:	Backup media to save programming assignments and the like. Recommend installing an Interactive Development Environment for any lab work performed off campus.	
Recommended IDE:	Oracle JAVA JDK with NetBeans IDE (free download) or IBM Eclipse IDE (free download)	
Description:	This course focuses on intermediate to advanced programming topics dealing with logical structures of data, together with the design and analysis of related algorithms. Topics in memory management include arrays, stacks, queues, lists, trees, and hashing. Algorithms for searching, sorting and information retrieval area also explored. Students demonstrate proficiency by completing laboratory assignments.	
Topics Included:	Inheritance programming principles Structures Software Engineering Arrays and Lists Stacks and Queues Recursion Linked Structures Pipes and Bounded Buffers Fundamental Searching Simple Sorts Hashing	

Trees construction and traversal

Course Objectives: To become proficient with the fundamental tools of program design using structured problem solving, data representation, software engineering principles and comparative analysis of algorithms. To develop the ability to design and write programs for implementation of such algorithms. By the end of the course, the student will develop intermediate to advanced level programming techniques including:

- Declaration and use of various non-primitive data types.
- Define and build basic data structures.
- Understand applicability for the various data structures.
- Understand the concept of logic encapsulation.
- Fundamental management of data in virtual storage.
- Understand differences between recursive and iterative methods.
- To design algorithmic solutions to storage problems.
- Implement designed algorithms into programming code.
- Demonstrate data structure storage management problem solutions.

Learning Strategies: Hands-on programming exercises.
Debugging of programs.
Lecture and discussion of logic techniques.

Attendance Policy: Students are expected to attend all class sessions and are responsible for all material presented in class, all homework, labs and reading assignments. If a student has more than 2 unexcused absences, his/her final grade will be lowered by 10 points, then 10 points more for each additional occurrence. Excessive absence may be considered sufficient cause for dismissal from class. Missed work and lecture is the responsibility of the student to obtain information from sources other than the instructor. Contact me in advance when you know that you will be missing any class session to avoid an attendance penalty.

Lateness Policy: The student must inform the instructor in advance if he/she will be late. If the student is late 3 times in excess of 20 mins, the lateness will count as an absence and you will be penalized for 1 class participation unit. The same applies for leaving a class early. If you come in late it is your responsibility to ensure that the instructor has recorded you as present.

Classroom Participation: A significant portion of your grade is based upon class participation. When lesson material is presented during lecture, students are to ignore all personal electronic devices and participate in the learning process. When the lesson material is focused on hands-on learning, students are to be engaged in lessons as directed by the instructor. It is expected that you will participate enthusiastically and frequently in all class discussions and stay for the full class length. When you have questions regarding the subject matter you must ask them during the class period; not during

breaks or after class. Raise your hand to be recognized. You will be penalized class participation units for using any electronic distractions during class. Each student will be called upon to discuss the current topic. If you are wearing earbuds, Google glasses, hoodies over your head, or other such then you are clearly indicating that you are not interested in the lecture or discussion. I will note the incidence without any discussion with you and deduct grade points as I determine appropriate.

- Homework:** Reading will be assigned as well as questions relating to the covered topic. The homework is intended to reinforce the material presented in class and to prepare the student for in class discussions and examinations. The student is expected to be prepared to discuss the reading assignment in class. If you do not read the assignments it will be readily noticed in this class.
- Work Submission:** All assignment materials and homework must be submitted via demonstration or email. Work and source-code must be checked for accuracy, be well documented, with comments, neatly formatted, easily readable and meet specifications. Labs must be well tested; work returned due to lack of sufficient testing will suffer loss of grade points. Work is expected by the due dates. If you did not receive a response to your emailed assignments you must assume that it did not reach me. Keep a copy of my reply. This is your proof that I acknowledged your email. If you are missing deadlines then it is not likely that you will be successful in this course. Lab assignments are due two weeks after the lab has been assigned. No work is accepted on the day of the final exam. Grades are based on the timeliness and the quality of work completed in meeting the requirements for this course.
- Communications:** All communication outside of class must be by the college email system. Messages will be responded to within 2 business days of receipt.
- Other Student Expectations:** Communicate often with the instructor about any concerns or problems. By FERPA legislation, I can discuss student concerns only with the student. Take notes on the ideas, facts and concepts presented. The student is expected to be familiar with text editing. Perform all reading assignments on time. Be prepared to discuss material in class. Put forth a maximum effort to learn and master the subject material with interest and persistence. Note that the class schedule is "tentative" and subject to change. It is your responsibility to be aware of changes made to the schedule. A student in this course is expected to spend at least two hours of study for every hour in the class, therefore I expect each student to spend 6 to 8 hours a week outside the classroom working on programs and studying. The instructor provides "website" notes to supplement lecture and reading materials. These notes are not to be considered a substitute for class attendance or any reading assignments. I update these notes frequently during the semester. Information discussed in lectures may not be covered in the notes. Students should not interrupt lectures except for topic related questions. Again raise your hand to be recognized.
- Other Student** Each student is held responsible for the following:

- Responsibilities:** Being aware of important dates on the college calendar including the last date to withdraw.
Understanding the information contained in this syllabus.
Using the college website for any information with regards to cancellations.
Checking their assigned college email each and every day.
Recognize and be familiar with the full contents of the Student Handbook and all college policies.
Understanding the policy on “Academic Integrity”.
- Late Work Policy:** All projects and assignments are to be submitted on the designated due date
Be aware that late work will affect your grade. Work submitted late will be marked off 10 percent for every class session the assignment is late. Emailed assignments are acceptable when timestamped prior to date due. You will not be reminded to complete your work. It is your responsibility to get your assignments in on time regardless of computer problems.
- Missed Exam Policy:** Exams missed due to an excused absence must be made up within one week.
Arrangements for make-up exams must be made between the instructor and the student prior to the regularly scheduled exam. Exams missed due to an unexcused absence cannot be made up and will receive a **zero** grade. Should you need to miss an exam you must inform me well in advance.
- Data:** It is the student's responsibility to ensure that his/her work is backed up to and recoverable from reliable media. There will be no acceptable excuse for lost or inaccessible assignments. Your computer's integrity is your responsibility. Any problems with campus equipment, hardware or software must be directed to the IT department by the student.
- Cheating:** Cheating on examinations, through use of unauthorized aids, wandering eyes or inappropriate resources, is forbidden. In addition, plagiarism, or the unattributed use of another persons words, code, algorithms or ideas, through either direct appropriation or paraphrase, is a serious breach of academic standards. Collaboration unless so instructed by the instructor is cheating. If you are found to be cheating you will be given an “**F**” for the course.
- Electronic Equipment:** No mobile phones are permitted to be audible during class. No mobile phones are permitted to be on during exams. Computing equipment is permitted for classroom assignments. Text messaging, audio, social networking and Internet surfing is prohibited at all times.
- Disability Accomodations:** Students with documented disabilities are entitled under the law to reasonable accommodations. If you have a disability and need accommodations, please notify the instructor as early as possible during the semester. You should also contact the Office of Disability Services.

Academic Conduct In order to maintain academic integrity, the college community will not tolerate any forms of academic dishonesty. Academic integrity is in effect at all times in this course. I expect that all papers, exams, quizzes, and laboratory assignments submitted by each student reflects his/her own work, and that he/she did not give or receive unauthorized aid in any of this work. Students may not collaborate in the preparation of assignments, papers, laboratory assignments, or examinations without the expressed permission of the instructor. Examples of unacceptable forms of dishonesty include cheating, copying, fabrication, plagiarism, unauthorized collaboration, submitting someone else's work as one's own; dishonesty through the use of technology such as sharing disks, files, or programs; access to, modification of, or transfer of electronic data, system software or computing facilities.

Failure to abide by these expectations may result in the faculty member submitting a formal complaint of the incident to the Office of Student Development & Enrollment Management. The Vice President will refer the complaint to the Academic Integrity Review Board, which is composed of faculty, academic administrators, and the Vice President of Student Development & Enrollment Management. The Academic Integrity Review Board will review the circumstances surrounding the incident and make a recommendation of appropriate disciplinary action. Penalties imposed on the student who violates this policy may vary from failing the unit of work to expulsion from the college. Violations of this policy are recorded permanently on the student's transcript.

Miscellaneous: "Publication" of written work and assignments -- By your continuation in this course and by submitting written assignments and work, you understand that you are granting a limited license to publish that work for the purposes of grading the work. That limited license extends to my submission, within my sole discretion, to various electronic grading tools (e.g., grading books, cite checkers, etc.). College hardware, software and network technology-specific questions are to be directed to IT personnel.

Methods of Evaluation:	Course grade is determined as follows:	
	Mid-Term Exam	15%
	Final Exam	15%
	Labs	40%
	Project	15%
Participation	15%	

Grading System:	A = 92 - 100	C + = 78 - 82	F = 0 - 64
	B+ = 88 - 91	C = 71 - 77	
	B = 83 - 87	D = 65 - 70	

Tentative Itinerary
(subject to change as instructor deems necessary)

Week	Text Chapter/Topic	Topic	Hands-on labs
1	Intro, workstation setup, course requirements, Data organization.	Short intro to various data structures, Arrays	Array design
2	2	Stacks	Stack methods
3	3	Recursion	Binary Search
4	4	Queues	Linear and Circular queues
5	4	Linked Lists	Single linked list
6	4	Linked Stacks and Queues	Double linked list
7	Midterm Exam	Chapters 1-4	(March 8)
8	(Spring Break)		
9	4	Priority Manipulation	Traversals Prioritizing elements
10	5	Trees	Binary Tree construction
11	6	Trees	Tree traversal
12	7	Hashing and retrieval	Hash construction
13	7	Sorting	Bubble, shell, quicksort
	Presentations	Project Demos	projects due
14	Presentations	Project Demos	no lab work accepted after today
15	Chapters 5-7	Final Exam	(May 3)