Computer Science 205
Fundamentals of Computer Science II
Spring 2014

Instructor: Dr. Joan M. Lucas
Office: 206 Albert W. Brown Building
Email: jlucas@brockport.edu

Electronic Resources: access the class site at http://angel.brockport.edu. All class email is routed through this site. All assignments, supplemental readings and class handouts are posted at this site. If you do not use ANGEL daily, then arrange to have that email forwarded.

Office Hours: Mon. 10:00 – 12:00, Thur. 9:30 – 11:30, and by appointment.

Textbook: "Data Structures: Abstraction and Design Using Java", 2nd edition, Elliot B. Koffman and Paul A. T. Wolfgang, John Wiley 2010, ISBN 978-0-470-12870-1.

Purpose of Course: This course covers an introduction to abstract data structures and their implementation. Includes these topics: program development (interpreting specifications, object-oriented and top-down development, information hiding, structured testing), stacks, queues, linked lists, recursion, trees, searching and sorting algorithms, introduction to analysis of algorithms, program verification, event-driven programming with graphical user interfaces. Requires extensive programming and supervised laboratory sessions.

Student Learning Outcomes: On completing this course, a student will
- Be able to use an advanced Integrated Development Environment (IDE), such as Eclipse, for software development.
- Demonstrate an understanding of software design using the object-oriented language Java, using advanced features such as interfaces, abstract classes and polymorphism.
- Demonstrate an understanding of data structures such as stacks, queues, linked lists, heaps, binary search trees, and hash tables and their implementation in Java
- Be able to apply the concepts of complexity analysis to compare different algorithms and data structures.
- Know a variety of sorting algorithms such as merge sort, quicksort, heapsort, and their advantages and disadvantages and will demonstrate competency in comparing alternative solutions.
- Be able to recursive algorithms for list and tree structures.
- Be able to use Java GUI components to create an event-driven program.
- Demonstrate competency in using software development lifecycle methodology to design a solution for a medium-scale project and can use data structures in larger programs.
- Demonstrate competency in designing and implementing a Web-based system.

- Be able to write good documentation, following Java documentation standards, for Java programs containing multiple classes.
- Demonstrate competency in creating and executing test plans, and discovering and eliminating errors shown by test results. Understands Java's exception handling mechanism.
- Contribute as a team member to the design and implementation of a system.
- Demonstrate a commitment to fulfilling assigned responsibilities and demonstrates an ability to communicate with team members.

Outline of Topics:

	Topics	**Reading**
Week 1	Software life cycle, interfaces, polymorphism,	Chap. 1.1 – 1.5
Week 2	Program correctness, exception handling, efficiency of algorithms, wrapper classes	Chap. 1.6
Week 3	Collections, Lists, ArrayLists, iterators, generics	Chap. 2
Week 4	Collections, Lists, LinkedLists cloning: shallow vs. deep cloning	Chap. 2
Week 5	Stacks. Parsing – prefix, postfix, infix	Chap. 3
Week 6	FIFO Queues, 2D arrays	Chap. 4
Week 7	GUI programming, layout managers Inner and nested classes	Appendix C
Week 8	Recursion, binary search, Comparable and Comparator	Chap. 5
Week 9	Recursion, Mergesort, Quicksort, Backtracking	Chap. 5 and Chap. 8
Week 10	Heaps, heapsort, Priority Queues, Huffman Trees	Chap. 6.5 – 6.6
Week 11	Trees, Binary Trees, Tree traversals, packages, visibility modifiers	Chap. 6.1 – 6.3, 1.7
Week 12	Binary Search Trees, balanced trees	Chap. 6.4
Week 13	Collections, Sets and Maps	Chap. 7.1 – 7.2
Week 14	Hashing, Enumerated Types	Chap. 7.3 – 7.5

The above outline is subject to change at the instructor's discretion.

Prerequisites: CSC 203 and MTH 281.

Workload:

	Lab Assignments	35 % of total grade
	Homework	15 % of total grade
	Projects	20 % of total grade
	Midterm Examinations	15 % of total grade
	Final Examination	15 % of total grade

Policy on Assignments: Lab assignments will be due one week following the lab period. Any late assignments will be penalized **10 % for each day late** (not counting weekends and holidays). When computing the number of days late, each day is considered to start at the same time that the class begins. No assignment will be accepted more than 1 week after the due date.   If you have trouble meeting the deadlines, you are encouraged to consult me at my office. No assignment will be accepted after the final exam is given.

For most lab assignments you will be expected to complete the labs in groups of two. This is the technique of "pair programming". Each pair will hand in **only one**, final version of their joint work. Both members of the teams will receive the same grade for the work. Be sure to **include both names** in the header comment of **each** file of your source code. You may upload your lab into the **Drop Box** of either member of the team, but only one copy of the lab should be uploaded. Be sure that you are using a **browser that is supported** by ANGEL (i.e., Internet Explorer, Firefox, Chrome), otherwise your files may not be uploaded. I will grade the most recent version that you turn into the Angel Drop Box, and will not read any earlier versions. Once I have graded a lab, I will not read any later/further versions that might be submitted.

All homework assignments are to be done on an individual basis. All of the following activities are examples of academic dishonesty, are unacceptable, and are considered grounds for failure and other disciplinary actions as stipulated in the "College Policy on Academic Dishonesty" in the Brockport Student Handbook: group efforts, having someone else complete the assignment for you, copying the work of another student, allowing another student to copy your work, handing in a program together with output that was **not** generated by the same program, plagiarism, locating and copying a solution from the Web, theft or unauthorized borrowing of other students' printouts, etc.

Policy on Examinations: All exams are cumulative, though each exam (including the final) will emphasize the more recent material presented in the class.

Grading Policy: Note that a grade of "C" or better is required for this course for all majors in Computer Science or Computer Information Systems. A grade of "C-" is not sufficient.

>= 95 %	A	
>= 90 %	A-	< 95 %
>= 87 %	B+	< 90 %
>= 83 %	B	< 87 %
>= 80 %	B-	< 83 %
>= 77 %	C+	< 80 %
>= 73 %	C	< 77 %
>= 70 %	C-	< 73 %
>= 67 %	D+	< 70 %
>= 60 %	D	< 67 %
>= 55 %	D-	< 60 %
	E	< 55 %

ANGEL: All course materials will be distributed through the ANGEL course management system. Grades for each assignment will be posted on ANGEL. You will be able to see the class average for each assignment, using the "Learner Profile" tool. Do

NOT rely on the averages calculated by ANGEL for any combination of your own assignments, as they can be inaccurate. In general it is always a good idea to keep copies of all your work, including all copies of graded work, until after the end of the semester.

Policy on Attendance: Faculty Senate legislation mandates student attendance in all classes. More than 2 absences from class (excused or otherwise) may result in a lower final grade. Late arrival to class will be considered equivalent to half an absence. Students who are unable to attend the examinations or meet the deadlines for assignments on particular days due to religious beliefs must contact me ahead of time and work out an alternate arrangement.

Disability Statement: Students with documented disabilities may be entitled to specific accommodations. SUNY Brockport's Office for Students with Disabilities makes this determination. Please contact the Office for Students with Disabilities at (585) 395-5409 or osdoffic@brockport.edu to inquire about obtaining an official letter to the course instructor detailing approved accommodations. The student is responsible for providing the course instructor with the official letter. Faculty and staff work as a team with the Office for Students with Disabilities to meet the needs of students with disabilities.

Evacuation Procedures: In the event of a fire alarm or other emergency notification, please gather your belongings and calmly go to the nearest exit. Once you are outside the building, please gather at the **east side of Tuttle South (near the parking lot)**, where the class will meet together. A head count needs to be taken to ensure all occupants have left the building. The elevators should not be used as they are programmed to shut down during a fire alarm. Doors and, if possible, windows, should be closed as the last person leaves a room or area. Please stay at least 200 feet away from the building until it has been cleared for re-entry by the Fire Department, University Police, and/or College personnel. If you feel you may need assistance to exit the building, please notify me as soon as possible.

Course Schedule:
Midterm Exam 1   Thursday, March 6, in class
Midterm Exam 2   Thursday, April 17, in class
Final Exam   To be announced