Oakton Community College

CSC 241 *Java Data Structures*

Course Syllabus - Spring 2021

I *Instructor Information*

Instructor Name:	**Professor Katherine Papademas**
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Office Telephone:	(773) 775 - 1087 (9:00 a.m. until 10:00 p.m.)
E - Mail Address:	kpapadem@oakton.edu
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Office Hours:	Tuesdays / Thursdays 4:00 PM / 4:30 PM
Office Room:	Room 2171 DP / 1833 DP

II *General Course Information*

Meeting Time and Place: meeting time(s): _____ place: room(s) _____

Credit Hours: 3 Credit Hours Lecture / 1 Credit Hour(s) Lab

Course Description: A second course in computer programming that provides a survey of data structures. Content covers: utilization of object-oriented programming design techniques to implement large-scale problems; lists, trees, tables, queues, stacks, graphs and other classes using the Java language; elementary methods of program verification and complexity analysis applied to algorithms that manipulate dynamic and static data structures; sorting and searching algorithms; abstract data types; recursion.

Course Prerequisite(s): CSC 156 with a minimum grade of C .

III *Required Instructional Materials*

Course Textbook(s): Object-Oriented Data Structures Using Java, 4th Edition, by Dale, 2018, Jones & Bartlett.
ISBN: 9781284089097

Supplemental Materials: Includes PPTs, handouts and special project information.

Other Items: Required: Thumb drive, folders, pens and pencils.

Class Tutorial Reference:
Java Learning Trail - https://www.tutorialspoint.com/java/index.htm

Suggestive Resources:
Eclipse - https://www.eclipse.org/downloads/

IV *Course Objectives*

Key Objectives: The basic learning objectives are:

A. Use stream I / O: files and console for basic interaction within the program interface.

B. Use object - oriented programming skills to design maintainable classes in separate class files and employ multiple file compilations.

C. Design and develop simple class hierarchies with the use of templates and abstract classes.

D. Apply the concepts of dynamic binding, polymorphism, inheritance, and method overloading.

E. Write expressions that use reference and static variables as data members and method arguments, and class methods for object assignment and copy constructors.

F. Explain the concepts of information hiding, including the difference between public and private data members and methods.

G. Explain separating program implementation from the programming interface.

H. Analyze various algorithms for memory optimization, time complexity, and correctness in order to understand efficiency.

I. Implement various sort and search algorithms throughout the various fundamental data structures studied.

J. Apply recursive programming techniques when appropriate and contrast the iterative versions.

K. Use dynamic and static memory to write data structures such as linked lists, stacks, queues, binary trees and tables.

L. Write and use basic functionality of data structures such as insert, remove and iterative schemes.

V *Outline of Course Topics*

Topics of Discussion:

A. Program Development

1. Complexity analysis of efficiency
    a. Big-O notation
2. Design strategies
    a. Modularity
    b. Recursion
    c. Object-oriented class relationships
        i. Inheritance and encapsulation
        ii. Java packages
        iii. Dynamic binding
        iv. Abstract templates
3. Program verification

B. Abstract Data Design

1. Lists
    a. Stacks and queues
    b. Variations
2. Trees
    a. Binary search trees
    b. Tree traversals
3. Tables
    a. Priority queues/heaps
4. Graphs
5. Hashing
    a. Hash tables
    b. Hash maps

C. Algorithms

1. Sorting
    a. Selection and insertion sorts
    b. Merge, heap & quick sorts
2. Searching
    a. Binary and sequential searches
    b. Hash functions
    c. Breadth and depth first searches

VI *Methods of Evaluating Student Progress*

Grading Scale: Grading will use the scale: 100 % to 90 % is an A (Superior) , 89.99 % to 80 % is a B (Good) , 79.99 % to 70 % is a C (Fair) , 69.99 % to 60 % is a D (Poor) and 59.99 % to 0 % is an F (Failing) .

Grade Determination:

Your final course grade is based on the following:

Homework / Quizzes 100 points each , Midterm Exam 100 points each, Final Exam 200 points each, Lab Projects 100 points each.

VII *Methods of Instruction*

Lectures, class discussion, individual and group projects, and use of a computer laboratory. Course may be taught as face - to - face, media - based, hybrid or online course.

VIII *Course Practices Required*

Reading of the text is required for understanding the material. Use of a computer laboratory is necessary to learn the design of the software.

IX *Academic Integrity*

Integrity Policy: Students and employees at Oakton Community College are required to demonstrate academic integrity and follow Oakton's Code of Academic Conduct. This code prohibits:

- cheating,
- plagiarism (turning in work not written by you, or lacking proper citation) ,
- falsification and fabrication (lying or distorting the truth) ,
- helping others to cheat,
- unauthorized changes on official documents,
- pretending to be someone else or having someone else pretend to be you,
- making or accepting bribes, special favors, or threats, and
- any other behavior that violates academic integrity.

There are serious consequences to violations of the academic integrity policy. Oakton's policies and procedures provide students a fair hearing if a complaint is made against you. If you are found to have violated the policy, the minimum penalty is failure on the assignment and, a disciplinary record will be established and kept on file in the office of the Vice President for Student Affairs for a period of 3 years.

Please review the Code of Academic Conduct and the Code of Student Conduct, both located online at
www.oakton.edu/studentlife/student-handbook.pdf

X *Other Course Information*

Additional Items of Note:

(a) You are responsible for any classes that you miss. Have telephone numbers of others in the class; get assignments, notes, deadlines etc. from them.

(b) Changes to this syllabus may be made when deemed appropriate and without notice.

(c) Tutors are available by appointment in room DP 2400 / RHC A135 .

(d) Points will be deducted on assignments that are submitted past the due date.

(e) Bulk assignment submissions will not be accepted.

(f) Use of smartphone devices for non - emergency purposes, during the lecture / lab sessions, is prohibited.

(g) Laptop / computer use during classroom lecture time is to be restricted to related course materials and / or Web sites. Completion of homework or lab assignments during the class lectures is not allowed.

(h) Only currently posted assignments will be valid for this semester.

DISABILITIES
If you have a documented learning, psychological, or physical disability you may be entitled to reasonable academic accommodations or services. To request accommodations or services, contact the Access and Disability Resource Center at the Des Plaines or Skokie campus. All students are expected to fulfill essential course requirements. The College will not waive any essential skill or requirement of a course or degree program.

Oakton Community College is committed to maintaining a campus environment emphasizing the dignity and worth of all members of the community, and complies with all federal and state Title IX requirements.
Oakton Community College is committed to combatting sexual misconduct. As a result, college faculty and staff members are required to report any instances of sexual misconduct, including harassment and sexual violence, to the Title IX Coordinator so that all parties involved may be provided appropriate resources and support options. There are two important exceptions to this requirement:

1) A list of the college's Confidential Advisors who, as counselors and medical professionals, do not have this reporting responsibility and can maintain confidentiality, can be found here:
https://www.oakton.edu/studentservices/counseling/contact/

2) An important exception to the reporting requirement exists for academic work. Disclosures about sexual misconduct that are shared as part of an academic project, classroom discussion, or course assignment, are not required to be disclosed to the college's Title IX office.
Students who have been subjected to any form of sexual misconduct, are encouraged to access these resources:

- Office of Student Affairs: 847-635-1745
- SHARE @ the Wellness Center: 847-635-1885 (8:30 AM TO 5 PM M-F) and 847-635-1880 (after business hours to reach the Counselor on Call)
- Oakton's Title IX webpage: https://www.oakton.edu/about/title_ix/index.php

If there is a safety concern, please contact Oakton Police Department, 847-635-1880.
Other reporting information is available here:
https://cm.maxient.com/reportingform.php?OaktonCC&layout_id=2
Resources and support for:

- Pregnancy-related and parenting accommodations can be found at: https://www.oakton.edu/about/title_ix/pregnancy_parenting.php
- Resources and support for LGBTQ+ students can be found at www.oakton.edu/lgbtq

Electronic video and / or audio recording is not permitted during class unless the student obtains written permission from the instructor. In cases where recordings are allowed, such content is restricted to personal use only. Any distribution of such recordings is strictly prohibited. Personal use is defined as use by an individual student for the purpose of studying or completing course assignments.

For students who have been approved for audio and / or video recording of lectures and other classroom activities as a reasonable accommodation by Oakton's Access Disabilities Resource Center (ADRC) , applicable federal law requires instructors to permit those recordings. Such recordings are also limited to personal use. Any distribution of such recordings is strictly prohibited.

Violation of this policy will result in disciplinary action through the Code of Student Conduct.

Oakton Emergency Building Closures. When an Oakton building is closed due to an emergency (e.g., weather-related closings), that doesn't mean instruction stops. Students should check for communications from their instructor via D2L, other learning environments such as myMathlab, or via email or text. If you don't receive communication from your instructor within 24 hours of building closure, please contact them.

XI *Academic Etiquette*

Classroom Behavior: Some guidelines are: (1) come to class prepared, (2) be courteous, and treat one another and your professor with respect, (3) pay careful attention to the lecture and (4) follow any instructions promptly.

XII *Attendance Policy*

Attendance Policy: The college's attendance policy will be followed.

XII *Due Date and Lateness Policy*

Students must adhere to due dates for any and all assignments. Late points at the instructor's discretion will be deducted accordingly if assignments are turned in beyond the scope of the due dates for any assignment given. Bulk turn ins of any and all assignments will not be permissible and therefore not be included as an acceptance for credit.

Tentative Weekly Outline of Course Topics

Week	Topic(s)
1	**Chapter 1 Getting Organized**
2	**Chapter 1 Getting Organized**
3	**Chapter 2 The Stack ADT**
4	**Chapter 3 Recursion**
5	**Chapter 4 The Queue ADT**
6	**Chapter 5 The Collection ADT**
7	**Chapter 6 The List ADT**
8	**Chapter 6 The List ADT**
9	**Chapter 7 The Binary Search Tree ADT**
10	**Chapter 8 The Map ADT**
11	**Chapter 9 The Priority Queue ADT**
12	**Chapter 10 The Graph ADT**
13	**Chapter 11 Sorting and Searching Algorithms**
14	**GUI programming / Final Lab Projects intro discussion**
15	**Final Projects continued**
16	**Final Exam Study**