

Oakton Community College

Fall 2018 Course Syllabus

CSC 255-0C1 online

Objects and Algorithms

Instructor: Kamilla Murashkina

Email: kmurashk@oakton.edu

Website: <http://www.oakton.edu/~kmurashk>

Office Hours: Mondays 4:00pm-5:00pm (optional online chat D2L)

Division II phone: +1 847-635-1688, office 2180 DP

Dates: August 20, 2018 – December 12, 2018

I. Course Prefix/Number: CSC 255

Course Name: Objects and Algorithms

Credits: 3 (3 lecture; 1 lab)

CRN 30508

II. Prerequisite

Recommended: MAT 144 with minimum grade of C. Required: CSC 240, CSC 241, or CSC 242 with minimum grade of C.

III. Course (Catalog) Description

An intermediate programming course that continues the development of object-oriented techniques and data structures with an emphasis on graphs, sets, maps, hash maps/tables, heaps, and trees; foundational analysis and design of various algorithms that exhibit recursion, backtracking, divide and conquer, greedy strategies, branch and bound, dynamic, and randomization programming techniques and number generation; cryptography; introductory parallel programming techniques; includes an analysis of time and memory complexity using discrete metrics; sorting and searching techniques. The course is offered with an option for choice of programming languages (C++ or Java or Python).

IV. Learning Objectives

- A. Implement object-oriented programming techniques including the use and development of various data structures via dynamic or static memory allocation.

- B. Classify the algorithmic complexity of functions or discrete code blocks with iteration by using discrete mathematical metrics such as Big-O notation.
- C. Identify or develop the implementation of algorithms to find solutions for various advanced programming problems involving a variety of object-oriented data structures and analyze the results.
- D. Explain the role of using random/pseudorandom number generation in cryptography.
- E. Implement sorting and searching algorithms involving data structures such as binary trees and tables to solve programming problems and analyze the results.
- F. Implement distributed and multi-threaded algorithms through the use of parallel schemes to solve problems and analyze the results.

V. Academic Integrity and Student Conduct

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

A grade of 0 will be assigned to a test or assignment where there is evidence of academic misconduct. This includes any form of plagiarism. All programs must be completed individually by the student. Copying code from any other source other than our textbook source code is considered plagiarism and will not be accepted. Do not attempt to copy another students' code. If copied code is submitted, you will all receive a grade of 0 and an Academic Integrity Violation form will be filed with the Office of Student Affairs.

If a tutor is involved with any code a student acquired assistance with to complete their assignments, the code must be written by the student and all of the code must include the tutor's name(s) and contact information in a commented section preceding it.

Each student is responsible for understanding their own code and will be held accountable for their programs' content. No matter what the circumstance is, if there is any matching code, it will be considered cheating. The instructor has over a decade of recognizing copied code—do not attempt to use any code other than your own. If a student cannot complete the assignments on their own, a Withdrawal from the course is recommended.

Students have been caught in the past and have received a score of 0 on the copied labs submitted. Don't cheat.

VI. Sequence of Topics

- A. Object-Oriented Programming
 - 1. inheritance
 - 2. polymorphism
 - 3. encapsulation
- B. Algorithmic Complexity Metrics
 - 1. big and little O notation
 - 2. big omega and theta notation
 - 3. recurrence relations
- C. Abstract Data Types
 - 1. sets and multisets/maps
 - 2. graphs
 - 3. heaps
 - 4. hash tables
 - 5. trees
- D. Algorithmic Paradigms
 - 1. divide and conquer
 - 2. greedy methods
 - 3. back-tracking
 - 4. random number generators
 - 5. distributed algorithms

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, hybrid or online course.

All of the supplementary course documentation can be found from the Content link via D2L.

Your D2L login is the same as your Oakton login.

The D2L login is here: <https://d2l.oakton.edu>

The Exams are taken online via D2L.

The online virtual office hours can be accessed via D2L also under Content at Office Hours Virtual Chat.

All of the work to be submitted for a grade is placed into an appropriate Dropbox folder via D2L.

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 software.

1. Complete Lab/Exercises assignments with the ability to demonstrate the proper use of the algorithms and logic identified.
2. Reading of the text is necessary to understand the course materials. Reading of the text will be required for reference to the language syntax.
3. Online Exams taken at the Testing Center or Proctoring Site.
4. Each student is required to communicate via their email address that set as preferred in myOakton (best via D2L email).

IX. Instructional Materials

Note: Current textbook information for each course and section is available on Oakton's Schedule of Classes.

https://www.bkstr.com/webapp/wcs/stores/servlet/booklookServlet%20?bookstore_id-1=70038&term_id-1=Summer2018&div-1=&dept-1=CSC&course-1=255§ion-1=8C1

Pick only 1 of the following 3 choices

Data Structures and Algorithms in C++ , 2E

Author: GOODRICH

ISBN: 13-978-0-470-38327-8

Copyright Year: 2011

Publisher: WILEY

or

Data Structures and Algorithms in Java, 6E

Author: GOODRICH

ISBN: 978-1-118-77133-4

Copyright Year: 2013

Publisher: WILEY

or

Data Structures and Algorithms in Python

Author: GOODRICH

ISBN: 9781118290279

Copyright Year: 2013
 Publisher: WILEY

AND

Access to D2L for online Content.

*Only one of the above texts is required to complete the Labs. If you wish to write code in both languages, then both texts are required; however, it is recommended to choose one of the texts and use one language.

I provide pdf files of the following optional textbooks that you can use as the references.

Data Structures and Algorithm Analysis in JAVA
Edition: 3rd
Author: WEISS
ISBN: 9780132576277
Copyright Year: 2012
Publisher: Pearson

or

Data Structures and Algorithm Analysis in C++
Edition: 4th
Author: WEISS
ISBN: 9780132847377
Copyright Year: 2014
Publisher: Pearson

X. Methods of Evaluating Student Progress

Quizzes, written homework, computer assignments, major examinations and a final examination will be used.

Grading Scale (as percent):

100.00 - 90.00 A

89.99 - 80.00 B

79.99 - 70.00 C

69.99 - 60.00 D

Below 60.00 F

1 Quiz-start 5 points == 5

Pretest 10 points == 10

Labs 1-8 each 10 points == 80

Cryptography Lab 15 points = 15

Exam1(Midterm) 20 points == 20

Exam2 (Final) 20 points == 20

The course is worth 150 points.

Your grade is calculated by: $(\text{your total accumulated points})/150 * 100\%$

Exams:

Exam topics are cumulative with the preceding Lab assignments and text readings.

All Exams are open book (hard copy or eText). One 8.5" x 11" college ruled paper is allowed for notes on the Exam (front and back is fine). The proctors collect this paper, so be sure to make an extra copy for your own future records.

Each Exam is to be taken during the week(s) identified on the Course Schedule.

You must take these Exams by their due dates, so please plan accordingly. You can take the Exams via D2L. There will be no extensions.

Each Exam will also have a written portion, which will require the writing of Java/C++/Python code.

Testing Location:

1) Either campus' Testing Center. Please plan to give yourself 2 hours for each exam, so get to the Testing Center at least 2 hours before they close. Here is the Testing Center site for more information: http://www.oakton.edu/studentservices/learning_center/testing/index.php

2) If student travel to campus is not possible, arrangements can be made for off-campus proctored testing, per the following:

Off-campus testing is available for distance learning students who cannot come to Oakton for free in-person testing. However, any costs for off-campus test proctoring services are the responsibility of the student.

If you plan to take tests for your online course somewhere other than one of Oakton's testing facilities, please:

1. Find an approved testing center that is convenient for you:
Identify a testing center at a nearby community college, university or private college willing to assist. Or, use Oakton's online virtual proctoring service, ProctorU. For this

virtual proctoring service, you will need to use a computer with webcam and microphone (standard on most laptop computers).

NOTE: We do not accept other proctors such as libraries or college professors, etc. Also, ALL out-of-country students are required to use ProctorU. Alternative Education reserves the right to reject a proctor at any time if there is reasonable doubt that the proctor will comply with Oakton testing guidelines.

2. Confirm that your chosen testing center will be available and that you are able to schedule an appointment for your required test dates. If special equipment is necessary to take the test, be sure it is available at the testing site you have chosen.
3. Submit an Off-Campus Testing Request form once for each course, each term. To complete this form, you will need to obtain a contact name, phone number and email address of a contact person at your chosen proctoring site. Oakton will use this contact information to deliver your test and/or testing instructions directly to the testing site. The [form](#) can be found by going to Oakton's home page, www.oakton.edu, and clicking on "Online Learning" in the menu on the left of the page. Scroll down to the paragraph on "Testing." Note: If ProctorU is selected, no other proctor information is required. Our office will send students an email with information on how to use this service. Unless you receive an error message, your request form has been received once you click "Submit."
4. Bring Photo ID to each exam. Off-campus proctors are required to confirm your identity.
5. Contact the Alternative Education office for additional assistance, to answer any further questions or concerns, and/or if you have not received an email confirmation by two days prior to each exam: Phone: 847-635-1970, email: alt-ed@oakton.edu

What to expect from your proctoring site:

1. Confirmation of student identity with photo ID.
2. Enforcement of testing requirements per faculty instructions, to best of ability.
3. Recording of test dates and times.
4. Entering the secret passcode provided by Oakton in order for you to access the online exam. (These online exams are submitted within the course software.)
5. If paper/pencil exams are utilized, or scratch paper is to be submitted, scanning and returning via email attachment (or FAX: 8447-635-1764) directly to your instructor at Oakton immediately upon completion unless prior authorization is given for a delay. Any unauthorized delays endanger acceptance of the test results for the student.
6. Retaining a copy of the completed exam (when appropriate) until confirmation of satisfactory receipt.

NOTE: In the event of difficulties at the time of the exam, beyond the control of the student and/or proctor, notify the instructor ASAP. The instructor will determine next steps.

Makeup Exams:

NO makeup exams are possible. All exams and labs are taken/submitted via D2L.

Lab/Exercise Assignments:

C++: Submit a working version of your code that can be compiled using at least g++ 4.6.2 (this is a C++11 compiler).

Java: Java SE Development Kit 8u65 or later

Python 3

Please place your completed Labs/Exercises into the Dropbox of the appropriate folder. Only upload the Java: **.java**, or C++: **.cpp**, **.h**, or Python: **.py** files and any necessary input text files: **.txt** into the appropriate Lab/Exercise Dropbox. If a Lab/Exercise requires more than one file to compile, zip all of the files into one folder and then submit them into the appropriate Dropbox folder. If any files are missing, a grade of 0 will be received. If the files are not zipped, a grade of 0 will be received. If the files compile with errors, a grade of 0 will be received. If there are any runtime errors, a grade of 0 will be received.

The .zip file must be named with the following convention:

Lab<Number>_<Your_Last_Name>.zip

For example, if you name is Smith: Lab1_Smith.zip

DO NOT zip a single file, if submitting a single file into the Dropbox folder. In this case, use the same naming convention as above for the file name.

For example: Lab1_Smith.java, or Lab1_Smith.cpp

1. To get positive grade, the programs must compile and run without any errors and give proper output.
2. Each Lab must be submitted by its due date.
3. Late submission: Labs will be penalized 10% of assignment grade every day they are submitted after the due date.
4. Multiple submission: each next submission: minus 10% of assignment grade.

The latest day any Lab can be turned in is 12/05/18 - NO EXCEPTIONS.

Exam 2 must be taken by 12/08/18, 2pm.

Incompletes:

Only given in extreme circumstances.

Incomplete grades are only given to students whom have shown prior work and have earned at least a "C" on all of their exams.

Incomplete Labs/Exercises:

A Lab/Exercise will receive a score of 0 if any of the following apply:

- 1) Compilation errors
- 2) Runtime errors
- 3) File name is does not follow the convention above
- 4) Multiple unzipped files are submitted
- 5) Input files are missing
- 6) Missing files necessary for compilation

Lab/Exercise Completion:

A Lab/Exercise will earn full points if it:

- 1) compiles with NO errors
- 2) follows the specifications
- 3) contains proper comments
- 4) contains good variable naming convention
- 5) contains proper scoping and indentation
- 6) produces NO runtime errors

If any of 1-6 above exist, the Lab/Exercise will not be accepted for points. Partial credit on Labs/Exercises is rarely given. Typically, a Lab score is full points if all six steps above are covered.

XI. Other Course Information

August 20

Fall 2018 semester classes begin.

August 27

Last day to submit proof of residency, business service agreements and chargebacks/joint agreements

September 3

Labor Day holiday. College closed.

September 17

Last day to withdraw from 16-week courses and have course dropped from record

September 17

Last day to change to audit for 16-week courses*

September 21

Last day for filing Graduation Petitions

October 22

Last day to withdraw with a "W" from 16-week courses; *Students will receive a grade in all courses in which they are enrolled after October 22.*

November 11

Veterans Day holiday. College closed.

November 12

Veterans Day holiday observed. College closed.

November 14

Registration opens for spring 2019 semester.

November 22, 23

Thanksgiving Recess. College closed.

November 24, 25

Thanksgiving Recess. No classes. College open.
(*Most offices closed.*)

December 11, 12

Evaluation Days†

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.

Resources and support for

- pregnancy-related and parenting accommodations; and
- victims of sexual misconduct

can be found at www.oakton.edu/title9/.

Resources and support for LGBTQ+ students can be found at www.oakton.edu/lgbtq.

Observance of Religious Holidays: Oakton Community College recognizes the broad diversity of religious beliefs of its constituencies. The College has embraced a practice of shared

responsibility in the event a religious observance interferes with class work or assignments. Students who inform instructors well in advance of an intended absence for a major religious observance will not be penalized. The instructor will make reasonable accommodations for students, which may include providing a make-up test, altering assignment dates, permitting a student to attend another section of the same course for a class period or similar remedies. Instructors are not responsible for teaching material again.

XII. Course Schedule

Week# - (start Monday)	Lab	Text Readings C++, Java, <i>Python</i>	Lab(s) Due Date 11:59 pm	Quiz/Exam / Due Date C++, Java, <i>Python</i>
Start 8/20 1—8/20	1	<u>Start Eclipse -Oxygen or Photon</u> <u>Weiss Ch1</u> C++, Java, <i>Python</i> <i>Ch1-Primer, Ch2-OOP</i>	Lab1 Monday 8/27	Quiz-start (there is only one quiz) Monday 8/27
2—8/27	2	Weiss Ch2 C++ Ch4 Analysis Tools, Java Ch4 Algorithm Analysis <i>Python Ch3 Algorithm Analysis</i>	Lab2 Tuesday 9/04	
3—9/04 Tuesday				Pretest. Program only. Open textbook, 120 minutes, must be taken in the Testing Center or with proctor. Available Thursday 9/06 8am – Saturday 9/08 2pm, D2L quiz (write a program code), can use IDE and textbook.
4—9/10	3	Weiss Ch7, C++ Ch11, Java Ch12 Sorting <i>Python Sorting and Selection</i> <i>Ch12</i>	Lab3 Monday 9/17	
5—9/17	4	Weiss Ch4, C++ Ch7,9,11 Trees, Maps, Sets, Java Ch 8,10 <i>Python: ch8, 10,11 Trees, Maps</i> <i>and Dictionaries, Sets, Multisets</i> <i>and Multimaps Search Trees</i>	Lab4 Monday 10/01	
6—9/24				
7—10/01				Exam 1 Midterm (Chapters 1, 2, 7, 4) <i>Python- corresponding chapters</i> 120 minutes, must be taken in the Testing Center or with proctor.

				Available Thursday 10/04 8am-Saturday 10/06 2pm, 120 minutes, D2L quiz, can use IDE and textbook.
8—10/08	5	Weiss Ch5 Hashing <i>Python:ch10.2 Hash Tables</i>	Lab5 Monday 10/15	
9—10/15	6	Weiss Ch6 PriorityQueues (Heaps) C++ ch9 Java ch10 <i>Python: ch9 PriorityQueues</i>	Lab6 Monday 10/22	
10—10/22	7	Weiss Ch 9 Graph Algorithms Minimum Spanning Trees Kruskal's Algorithm <i>Python ch14</i>	Lab7 Monday 10/29	
11—10/29	8	Weiss Ch10 Huffman Algorithm <i>Python ch13</i>	Lab8 Monday 11/12	
12—11/05				
13—11/12	9	Cryptography project RSA	Lab9 Monday 12/03	
14—11/19		Thanksgiving	11/22	Happy Holidays!
15—11/26				
16—12/03				Exam 2 Final (Chapters 5, 6, 9,10) <i>Python- corresponding chapters</i> Open textbook, 120 minutes, must be taken in the Testing Center or with proctor. Available Thursday 12/06 8am-Saturday 12/08 2pm, 120 minutes, D2L quiz, can use IDE and textbook.
17—12/10		Feedback/Reflection (no grade)		Available 12/06-12/8 (three days only)

* See the Content documents in D2L for more lab details.

Notice the Lab Due Dates. For example, Lab 1 is due on Monday 8/27, Pretest must be taken in between Thursday 9/06 8am – Saturday 9/08 2pm, etc.

Pretest, Exam1, and Exam to must be taken in the Oakton Community Testing Center or with proctor according to the schedule above.