



CS 213: Object Oriented Programming Spring (Jan-May) 2023 Syllabus

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Faculty Intern (Teaching Assistant) Kwabena Aboagye-Otchere (Cohorts A & C) <i>Office:</i> Room 107 (Engineering Building) <i>Email:</i> kwabena.aboagye@ashesi.edu.gh <i>Office hours:</i> Tuesdays and Thursdays 10:00 to 11:00 Fridays 8:00 to 10:00	Faculty Intern (Teaching Assistant) Ian Akotey (Cohort B) <i>Office:</i> Room 107 (Engineering Building) <i>Email:</i> ian.akotey@alumni.ashesi.edu.gh <i>Office hours:</i> Mondays and Wednesdays 10:00-11:00

Meeting Times:

Lectures: Cohort A: Tuesdays & Thursdays 8:00 – 9:30 (Location: DFH 218)
Cohort B: Tuesdays & Thursdays 9:45 – 11:15 (Location: DFH 218)
Cohort C: Tuesdays & Thursdays 11:30 – 13:00 (Location: JH 115)

Labs: Cohort A: Fridays 10:00 – 11:50 (Location: DFH 218)
Cohort B: Fridays 12:10 – 13:40 (Location: DFH 218)
Cohort C: Fridays 12:10 – 13:40 (Location: JH 115)

Course Overview:

This course builds upon the programming concepts from the Computer Programming for CS course and will develop students' ability to programme using the object-oriented paradigm and the Java language. It will give students an appreciation of the advantages of object-oriented programming, help them define and construct objects; and leverage abstraction, inheritance, polymorphism, and encapsulation to develop robust and maintainable applications. It will also introduce students to event-driven programming and graphical user interfaces, as well as the use of standard Java packages and the Java collections API. Good software engineering practices will be featured in various aspects of the course: characteristics of good software; documentation, testing; and coding practices which promote correctness and robustness. Also, notations like the Unified Modeling Language (UML) will be employed. Through one or more team projects, students will gain experience in designing and implementing larger applications than in their previous programming classes.

Course Objectives:

At the end of the course, students will be:

1. Fluent in the fundamental concepts of modern programming using an object-oriented paradigm.
2. Proficient in the syntax, structure and semantics of the Java language, including standard libraries for I/O, collections and graphical user interfaces
3. Able to design, develop and document applications for real-world solutions in a variety of domains such as business, science and society.

Ashesi Learning Goals Addressed in this Course:

1. **Ethics and Civic Engagement:** *An Ashesi student is an ethical, responsible and engaged member of his/her community.* Students are expected to maintain a very high academic and ethical standard, as described in the “Expectations” section below.
2. **Critical Thinking and Quantitative Reasoning:** *An Ashesi student is able to apply critical thinking and quantitative reasoning to approach complex problems.* This course is all about problem-solving with computers. Students will develop the ability to analyze relevant problems, design algorithms to solve them, and implement these algorithms in the Java programming language.
3. **Communication:** *An Ashesi student is an excellent communicator in a variety of forms.* This course requires students to write short 1-paragraph reflections of assignments and projects.
4. **Curious and Skilled:** *An Ashesi student is inquisitive and confident, has breadth of knowledge, and has attained a high level of mastery in their chosen field.* This course aims to develop skilled problem-solvers and programmers who have a widening understanding of the role of computer science and information systems in our complex world.
5. **Technology Competence:** *An Ashesi student is an effective and flexible user of technology.* This course focuses on developing a particular aspect of technology competence, namely programming in Java.

Textbooks & Resources:

Primary: W. Savitch, *Java: An Introduction to Problem-Solving and Programming*, 6th Ed. Pearson.

Supplementary: W. Savitch (2016), *Absolute Java*, 6th Ed., Pearson Education Ltd.

Sun Java online API reference: [Overview \(Java SE 9 & JDK 9 \) \(oracle.com\)](#), [Overview \(Java SE 17 & JDK 17\) \(oracle.com\)](#)

JavaFX Resources:

Doug Lowe, *JavaFX for Dummies*, John Wiley & Sons.

Carl Dea, *JavaFX 8: Introduction by Example*, 2nd Edition APress.

Learning activities:

In this course, learning takes place through a variety of activities, including lectures, reading, labs and assignments. Each of these is carefully designed to help you develop expertise in problem-

solving and programming, and none should be neglected. Historically, students who have paid careful attention to each of these aspects have been very successful and students who have neglected one or more of them have struggled.

- *Lectures*: The lectures will present essential concepts and include activities to help you grasp the essential principles and approaches that will make you a good problem-solver and programmer. The best way to get the most of the lectures is to be an active participant: coming to class well prepared, asking and answering questions in class, and participating in any discussions.
- *Reading*: The assigned reading introduces new concepts and clarifies and expands upon the material discussed in class. It includes additional details that we will not have time to dwell on in class, so you must do the reading in order not to miss this information.
- *Labs and Assignments*: Labs and assignments are primarily designed to give you practice and help you learn concepts that you cannot learn just by listening to a lecture. It is an opportunity to apply concepts in a context that allows you to seek clarification and guidance from the instructor and teaching assistants. Students who ensure that they complete and understand all the assignments typically go on to do well in the tests and exams, whereas students who fail to complete assignments typically go on to do very poorly in the exams.

Expectations:

The instructor and teaching assistant are committed to helping you to be successful in this course. In return, there are some fundamental expectations of you.

Participation

Your active participation enriches the course experience for everyone. Do not be afraid to ask questions! Your questions will probably help others in the class as well.

Professionalism

You are expected to interact with your course colleagues, as well as the instructor and teaching assistant in a professional and polite manner always.

Academic honesty

You are expected to always keep in mind that “*An Ashesi student is an ethical, responsible and engaged member of his/her community*”. The work in this course is designed to help you develop skills essential to your future career success. You can only develop these skills if you do the work yourself.

All the work that you turn in *must* be your own. For programming assignments, you are allowed and encouraged to brainstorm about the problems with your peers. You can talk in English (not Java!) about algorithms and approaches. However, unless you are explicitly asked to work in a team, you must sit down behind the computer and write the program you turn in yourself. If you copy a section of code from any source (e.g., part of an example from class, or from the course textbook) you must include an appropriate citation in a comment above the code segment that you copied. You may not copy code from the internet or from your peers – this is plagiarism, and furthermore, will not help you learn.

Evaluation Criteria

Your grade in the course will be determined according to the following criteria:

Class Preparation Assignments & Quizzes:	10%
Programming Assignments:	25%
Mid-Sem Exam:	20%
Final Project:	10%
Final Exam:	30%
Attendance & Participation:	5%

Some assignments may have some “extra credit” options for those who would like an additional challenge. The most important outcome of extra credit work is extra learning. Furthermore, doing extra credit work *may* influence your final grade if you are borderline (within 1% of a grade boundary) at the end of the semester. However, not doing extra credit work cannot harm you. Note that you should not do extra credit work at the expense of the main assignment, because it is the grade on the main assignment that counts towards your base grade for the course.

Late Policy

Class preparation assignments and quizzes are due as stated. No late class preparation assignments or make-up quizzes will be accepted for any reason, but your lowest grade will be dropped. All programming assignments are due when stated. You will lose 10% of your grade for each day your assignment is handed in late.

Schedule

Below is a tentative schedule. The schedule is subject to adjustment at the instructor’s discretion. Specific sections of the textbook to read for each lecture will be posted on CANVAS.

Key:

- JIPSP - “*Java: An Introduction to Problem-Solving and Programming*”
- AJ - “*Absolute Java*”

Week	Topics	Resources	Assignments & Assessments
Week 1 Jan 16 – Jan 20	Introduction to Object-Oriented Programming Introduction to Java: <ul style="list-style-type: none">• Basic syntax & conventions	JIPSP Ch 1 – 4	

	<ul style="list-style-type: none"> Getting started with flow of control (branching & loops) 		Assignment 1 released (Thu)
Week 2 Jan 23 – Jan 27	More about flow of control in Java	JIPSP Ch 3 & 4	Assignment 1 due (Fri, Jan 27)
Week 3 Jan 30 – Feb 3	Object-oriented analysis and design	JIPSP Ch 5 & 6	Assignment 2 released (Thu)
Week 4 Feb 6 – Feb 10	More on objects and classes	JIPSP Ch 5 & 6	Assignment 2 due (Fri, Feb 10)
Week 5 Feb 13 – Feb 17	Arrays (Single & multi-dimensional)	JIPSP Ch 7	Assignment 3 released (Thu)
Week 6 Feb 20 – Feb 24	Polymorphism & inheritance	JIPSP Ch 8	Assignment 3 due (Fri, Feb 24)
Week 7 Feb 27 – Mar 3	Mid-semester review and exam		Mid-Sem Exam (Fri, Mar 3)
Week 8 Mar 6 – Mar 10	MID-SEMESTER BREAK		
Week 9 Mar 13 – Mar 17	More on polymorphism & inheritance	JIPSP Ch 8	Assignment 4 released (Thu)
Week 10 Mar 20 – Mar 24	Exceptions and exception handling	JIPSP Ch 9	Assignment 4 due (Fri, Mar 24)
Week 11 Mar 27 – Mar 31	File I/O	JIPSP Ch 10	Project Starts (Mon, Mar 27)
Week 12 Apr 3 – Apr 7	Network I/O Java Collections Framework	JIPSP Ch 10 JIPSP Ch 12	Assignment 5 released (Thu)
Week 13 Apr 10 – Apr 14	Java Collections Framework	JIPSP Ch 12	Assignment 5 due (Fri, Apr 14)

Week 14 Apr 17 – Apr 21	JavaFX & GUIs	Graphics Supplement (1.4, 2.5, 3.4, 4.3, 5.4, 6.8, 7.6) Starting GUI Programming with JavaFX (coursera.org)	
Week 15 Apr 24 – Apr 28	Java FX & GUIs Class-wrap [Classes end on Thurs Apr 27]	Graphics Supplement (1.4, 2.5, 3.4, 4.3, 5.4, 6.8, 7.6) Starting GUI Programming with JavaFX (coursera.org)	Project Ends (Fri, Apr 28)
Weeks 16 & 17 May 1 – May 12	EXAMS		