IMPERIAL VALLEY COLLEGE

## Basic Course Information

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|---|---|---|---|
| Semester: | **Spring 2021** | Instructor Name: | **Octavio Ortiz** |
| Course Title & #: | **CS 231 – Intro to Data Structures** | Email: | **octavio.ortiz@imperial.edu** |
| CRN #: | **21126** | Webpage (optional): | **Canvas** |
| Classroom: | **Zoom** | Office #: | **N/A** |
| Class Dates: | **2/16/2021 – 6/11/2021** | Office Hours: | **Monday 4 – 5 PM** |
| Class Days: | **Online** | Office Phone #: | **N/A** |
| Class Times: | **Online** | Emergency Contact: | **N/A** |
| Units: | **3** | Class Format: | **Online** |

## Course Description

Further training in program design and development. Object-oriented programming to include inheritance, polymorphism, and generic code. Extensive programming in Java. Introduction to data structures: arrays, stacks, queues, linked lists, trees, hash tables, dictionaries, sets and graphs. Standard methods used for sorting, searching and analyzing the relative efficiency of algorithms (Big-O notation) (CSU, UC)

## Course Prerequisite(s) and/or Corequisite(s)

CS 221 with a grade of "C" or better.

## Student Learning Outcomes

Students are expected to master the following processes:

- Analyze unstructured problems and design computer solutions.
- Solve problems through iterative and recursive techniques.
- Employ an objected-oriented paradigm when creating applications.
- Apply and implement custom containers using generics.
- Create and implement appropriate data structures to solve a problem.
- Implement appropriate algorithms to solve a problem.
- Perform run-time analysis of algorithms and test relative efficiency of algorithms.
- Understand Big-O notation and its significance in the analysis of algorithms.
- Write code that scales well in real-world situations.

## Course Objectives

CS 231 further explores object oriented programming by delving into topics that include: inheritance and polymorphism, abstract classes and interfaces, recursion, generics, data structures, algorithms and relative efficiency of algorithms. Application problems and programming assignments will test student understanding of the aforementioned topics. Emphasis will be placed on writing applications that scale well and optimize efficiency.

## Textbooks & Other Resources or Links

**Introduction to JAVA – Programming and Data Structures**
Author: Y. Daniel Liang
Edition: 11th
ISBN: 978-0-13-467094-2
Copyright Year: 2018
Publisher: Pearson Prentice Hall

## Course Requirements and Instructional Methods

Each session will consist of a combination of lectures, group discussions, problem solving and reflecting on the concepts covered. Students will be encouraged to share their ideas with each other and with the class to promote active engagement. Programming assignments will be assigned weekly and checked for completion. Students will work on multiple projects that will assess their conceptual understanding of key topics in Java.

Out of Class Assignments:  The Department of Education policy states that one (1) credit hour is the amount of student work that reasonably approximates not less than one hour of class time and two (2) hours of out-of-class time per week over the span of a semester.  WASC has adopted a similar requirement.

## Course Grading Based on Course Objectives

The semester will consist of five quizzes, each of which will account for 20% of your overall grade. Although homework is not directly factored into the overall grade, it is crucial that you do all homework assignments as they will be the primary source for quiz problems.

| CATEGORY | PERCENT OF GRADE |
|---|---|
| Programming Assignments | 60% |
| Projects | 25% |
| Quizzes | 15% |

| | |
|---|---|
| A = | 90 – 100% |
| B = | 80 – 89% |
| C = | 70 – 79% |
| D = | 60 – 69% |
| F = | 0 – 59% |

## Course Policies

### Classroom Etiquette
- Electronic Devices:  Cell phones and electronic devices must be turned off and put away during class, unless otherwise directed by the instructor.
- Food and Drink are prohibited in all classrooms.   Water bottles with lids/caps are the only exception.  Additional restrictions will apply in labs.  Please comply as directed by the instructor.
- Disruptive Students:  Students who disrupt or interfere with a class may be sent out of the room and told to meet with the Campus Disciplinary Officer before returning to continue with coursework.  Disciplinary procedures will be followed as outlined in the General Catalog.
- Children in the classroom:  Due to college rules and state laws, only students enrolled in the class may attend; children are not allowed.

### Online Netiquette
- What is netiquette?  Netiquette is internet manners, online etiquette, and digital etiquette all rolled into one word.  Basically, netiquette is a set of rules for behaving properly online.
- Students are to comply with the following rules of netiquette:  (1) identify yourself, (2) include a subject line, (3) avoid sarcasm, (4) respect others' opinions and privacy, (5) acknowledge and return messages promptly, (6) copy with caution, (7) do not spam or junk mail, (8) be concise, (9) use appropriate language, (10) use appropriate emoticons (emotional icons) to help convey meaning, and (11) use appropriate intensifiers to help convey meaning [do not use ALL CAPS or multiple exclamation marks (!!!!)].

### Academic Honesty
Academic honesty in the advancement of knowledge requires that all students and instructors respect the integrity of one another's work and recognize the important of acknowledging and safeguarding intellectual property.

There are many different forms of academic dishonesty.  The following kinds of honesty violations and their definitions are not meant to be exhaustive.  Rather, they are intended to serve as examples of unacceptable academic conduct.

- Plagiarism is taking and presenting as one's own the writings or ideas of others, without citing the source.  You should understand the concept of plagiarism and keep it in mind when taking exams and preparing written materials.  If you do not understand how to "cite a source" correctly, you must ask for help.
- Cheating is defined as fraud, deceit, or dishonesty in an academic assignment, or using or attempting to use materials, or assisting others in using materials that are prohibited or inappropriate in the context of the academic assignment in question.

Anyone caught cheating or plagiarizing will receive a zero (0) on the exam or assignment, and the instructor may report the incident to the Campus Disciplinary Officer, who may place related documentation in a file.  Repeated acts of cheating may result in an F in the course and/or disciplinary action.  Please refer to the General Catalog for more information on academic dishonesty or other misconduct.  Acts of cheating include, but are not limited to, the following:  (a) plagiarism; (b) copying or attempting to copy from others during an examination or on an assignment; (c) communicating test

information with another person during an examination; (d) allowing others to do an assignment or portion of an assignment; (e) using a commercial term paper service.

## Additional Student Services

Imperial Valley College offers various services in support of student success. The following are some of the services available for students. Please speak to your instructor about additional services which may be available.

- CANVAS LMS. Canvas is Imperial Valley College's main Learning Management System. To log onto Canvas, use this link: Canvas Student Login. The Canvas Student Guides Site provides a variety of support available to students 24 hours per day. Additionally, a 24/7 Canvas Support Hotline is available for students to use: 877-893-9853.
- Learning Services. There are several learning labs on campus to assist students through the use of computers and tutors. Please consult your Campus Map for the Math Lab; Reading, Writing & Language Labs; and the Study Skills Center.
- Library Services. There is more to our library than just books. You have access to tutors in the Study Skills Center, study rooms for small groups, and online access to a wealth of resources.

## Disabled Student Programs and Services (DSPS)
Any student with a documented disability who may need educational accommodations should notify the instructor or the Disabled Student Programs and Services (DSP&S) office as soon as possible. The DSP&S office is located in Building 2100, telephone 760-355-6313. Please contact them if you feel you need to be evaluated for educational accommodations.

## Student Counseling and Health Services
Students have counseling and health services available, provided by the pre-paid Student Health Fee.
- **Student Health Center**. A Student Health Nurse is available on campus. In addition, Pioneers Memorial Healthcare District provide basic health services for students, such as first aid and care for minor illnesses. Contact the IVC Student Health Center at 760-355-6128 in Room 1536 for more information.
- **Mental Health Counseling Services**. Short-term individual, couples, family and group counseling services are available for currently enrolled students. Services are provided in a confidential, supportive, and culturally sensitive environment. Please contact the IVC Mental Health Counseling Services at 760-355-6310 or in the building 1536 for appointments or more information.

## Veteran's Center
The mission of the IVC Military and Veteran Success Center is to provide a holistic approach to serving military/veteran students on three key areas: 1) Academics, 2) Health and Wellness, and 3) Camaraderie; to serve as a central hub that connects military/veteran students, as well as their families, to campus and community resources. Their goal is to ensure a seamless transition from military to civilian life. The Center is located in Building 600 (Office 624), telephone 760-355-6141.

## Extended Opportunity Program and Services (EOPS)

The Extended Opportunity Program and Services (EOPS) offers services such as priority registration, personal/academic counseling, tutoring, book vouchers, and community referrals to qualifying low-income students. EOPS is composed of a group of professionals ready to assist you with the resolution of both academic and personal issues. Our staff is set up to understand the problems of our culturally diverse population and strives to meet student needs that are as diverse as our student population.

Also under the umbrella of EOPS our CARE (Cooperative Agency Resources for Education) Program for single parents is specifically designed to provide support services and assist with the resolution of issues that are particular to this population. Students that are single parents receiving TANF/Cash Aid assistance may qualify for our CARE program, for additional information on CARE please contact Lourdes Mercado, 760-355- 6448, lourdes.mercado@imperial.edu.

EOPS provides additional support and services that may identify with one of the following experiences:

- Current and former foster youth students that were in the foster care system at any point in their lives
- Students experiencing homelessness
- Formerly incarcerated students

 To apply for EOPS and for additional information on EOPS services, please contact Alexis Ayala, 760-355-5713, alexis.ayala@imperial.edu.

**Student Equity Program**
- The Student Equity Program strives to improve Imperial Valley College's success outcomes, particularly for students who have been historically underrepresented and underserved. The college identifies strategies to monitor and address equity issues, making efforts to mitigate any disproportionate impact on student success and achievement. Our institutional data provides insight surrounding student populations who historically, are not fully represented. Student Equity addresses disparities and/or disproportionate impact in student success across disaggregated student equity groups including gender, ethnicity, disability status, financial need, Veterans, foster youth, homelessness, and formerly incarcerated students. The Student Equity Program provides direct supportive services to empower students experiencing insecurities related to food, housing, transportation, textbooks, and shower access. We recognize that students who struggle meeting their basic needs are also at an academic and economic disadvantage, creating barriers to academic success and wellness. We strive to remove barriers that affect IVC students' access to education, degree and certificate completion, successful completion of developmental math and English courses, and the ability to transfer to a university. Contact: 760.355.5736 or 760.355.5733 Building 100.
- The Student Equity Program also houses IVC's Homeless Liaison, who provides direct services, campus, and community referrals to students experiencing homelessness as defined by the McKinney-Vento Act. Contact: 760.355.5736 Building 100.

**Student Rights and Responsibilities**

Students have the right to experience a positive learning environment and to due process of law. For more information regarding student rights and responsibilities, please refer to the IVC General Catalog.

**Information Literacy**

Imperial Valley College is dedicated to helping students skillfully discover, evaluate, and use information from all sources. The IVC Library Department provides numerous Information Literacy Tutorials to assist students in this endeavor.

## IVC Student Resources

IVC wants you to be successful in all aspects of your education. For help, resources, services, and an explanation of policies, visit http://www.imperial.edu/studentresources or click the heart icon in Canvas.

The following is a tentative calendar of the semester. Its purpose is to provide you with a general overview of chapters, homework assignments, tests and corresponding due dates that will be administered henceforth. The instructor will try to adhere to the calendar, however, he reserves the right to make adjustments to the calendar based on the progression of each session.

| Date or Week | Activity, Assignment, and/or Topic | Pages/ Due Dates/Tests |
|---|---|---|
| Week 1<br>February 16 – 19 | Syllabus & Introduction<br><br>Chapter 9 – Objects & Classes<br>• Class Structure (data fields, constructors, methods)<br>• Class instantiation and creating objects<br>• Access and visibility modifiers<br>• Static and non-static data fields and methods<br>• toString() method | **TBD** |
| Week 2<br>February 22 – 26 | Chapter 11 – Inheritance & Polymorphism<br>• Superclass and subclass<br>• Extending classes<br>• Keyword super<br>• Protected visibility modifier<br>• Polymorphism<br>• Overriding methods<br>• Instanceof and casting objects | **TBD** |
| Week 3<br>March 1 - 5 | Chapter 12 – Exception Handling<br>• Exception types<br>• Keyword throws<br><br>Chapter 13 – Abstract classes and Interfaces<br>• Abstract classes<br>• Implementing an interface<br>• Overriding abstract methods<br>• Comparable Interface | **TBD** |
| Week 4<br>March 8 – 12 | Chapter 18 – Recursion<br>• Understanding recursive methods<br>• Recursion vs iteration | **TBD** |

| Date or Week | Activity, Assignment, and/or Topic | Pages/ Due Dates/Tests |
|---|---|---|
| | • Recursion and stack/heap space | |
| Week 5<br>March 15 – 19 | Chapter 19 – Generics<br>• Benefits of generics<br>• Syntax for generic methods<br>• Syntax for generic classes and interfaces<br>• Wildcard Generic Types | **TBD** |
| Week 6<br>March 22 – 26 | Chapter 19 – Generics<br>• Benefits of generics<br>• Syntax for generic methods<br>• Syntax for generic classes and interfaces<br>• Wildcard Generic Types | **TBD** |
| Week 7<br>March 29 – April 2 | Review Chapters 9, 11-13, 18, and 19 | **TBD** |
| **Spring Break** | | |
| Week 8<br>April 12 – 16 | Chapter 20 – Lists, Stacks, Queues and Priority Queues<br>• Collections<br>• Iterators<br>• ForEach method<br>• Lists<br>• Comparator Interface<br>• Static methods for Lists and Collections<br>• Queues and Priority Queues | **TBD** |
| Week 9<br>April 19 – 23 | Chapter 20 – Lists, Stacks, Queues and Priority Queues<br>• Collections<br>• Iterators<br>• ForEach method<br>• Lists<br>• Comparator Interface<br>• Static methods for Lists and Collections<br>• Queues and Priority Queues | **TBD** |

| Date or Week | Activity, Assignment, and/or Topic | Pages/ Due Dates/Tests |
|---|---|---|
| Week 10<br>April 26 – April 30 | Chapter 21 – Sets and Maps<br>• Sets<br>• Performance of sets and lists<br>• Maps | **TBD** |
| Week 11<br>May 3 – May 7 | Chapter 22 – Developing Efficient Algorithms<br>• Algorithm efficiency and Big-O notation<br>• Algorithm and time complexity<br>• Examples: Determining Big-O | **TBD** |
| Week 12<br>May 10 – 14 | Chapter 23 – Sorting<br>• Insertion Sort<br>• Merge Sort<br>• Quick Sort<br>• Bubble Sort | **TBD** |
| Week 13<br>May 17 – 21 | Chapter 24 – Implementing Lists, Stacks, Queues and Priority Queues<br>• Array Lists<br>• Linked Lists<br>• Stacks and Queues<br>• Priority Queues | **TBD** |
| Week 14<br>May 24 – 89 | Chapter 24 – Binary Search Trees<br>• Binary Search Trees<br>• Deleting elements from a BST<br>• Tree visualization and MVC<br>• Iterators | **TBD** |
| Week 15<br>June 1 – 4 | Chapter 25 – Hashing<br>• Hash functions and hash codes<br>• Handling collisions<br>• Load factor & rehashing | **TBD** |

| Date or Week | Activity, Assignment, and/or Topic | Pages/ Due Dates/Tests |
|---|---|---|
| Week 16<br>June 7 – 111 | **Review chapters 20-25** | |

**\*\*\*Tentative, subject to change without prior notice\*\*\*\***