Introduction to Data Structures Section 05

CS 46B

Spring 2025   In Person   4 Unit(s)   01/23/2025 to 05/12/2025   Modified 01/22/2025

Contact Information

Instructor:	**Ricky Chan**
Email:	**koon-ming.chan@sjsu.edu**
Class Time:	**Tuesday and Thursday** **1:30pm - 2:45pm**
Classroom:	**MH 222**
Office Hours:	**Tuesday and Thursday** **2:45pm – 3:45pm** **Location: MH 222** **(Right after the class)**

Course Description and Requisites

Fundamental data structures including lists, stacks, queues, and trees, with algorithms for inserting, deleting, searching, and sorting information within them efficiently. Additional topics include Big-O analysis, exceptions, hashing, Java collections framework, generics, iterators, interfaces, recursion, and debugging. Weekly hands-on activities.

The class has lecture of 3 hours and Lab of 3 hours. This is a letter graded class.

Prerequisite(s):

CS46A or CS46AX (with a grade of "C-" or better). If CS46A was not in Java, then CS46AW also required.

Math Enrollment Category M-I or M-II and satisfactory score on the Precalculus Proficiency Assessment (70 or higher), or MATH 19 with a C- or better, or MATH 18A and MATH 18B with C- or better.

Allowed Majors: Computer Science, Data Science, Stats, Applied/Computational Math, Software Engineering or Forensic Science: Digital Evidence.

Remarks:

Students are required to submit proof of prerequisite satisfaction by the specified deadline indicated on Canvas (additional details available on Canvas). Failure to do so will be considered as non-compliance with the prerequisites, resulting in removal from the course.

Classroom Protocols

Students may be dropped from the class by the instructor for either one of the following reasons:
1. **Absence for 1st day of class without informing you before 2nd day of class**
2. **Lack of prerequisites.**

Remarks:

1. **Do not ask for special treatment. The rules for this course apply to everyone equally.**
2. **Cheating will not be tolerable; a ZERO will be given to any cheated assignment/exams, and it will be reported to the Department and the University.**
3. **Do NOT share or post online any course materials, class slides, or homework solutions. Use of electronic devices during exams is NOT allowed unless stated otherwise.**
4. **You are required to check Canvas for reading and assignments.**
5. **The information on this syllabus is subject to change. Notice of changes will be provided. It is your responsibility to become aware of them.**

Attendance:

University policy F69-24 at http: /www.sjsu.edu/senate/docs/F69-24.pdf states that Students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to insure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading. However, attendance will be required in order to complete and submit many in-class exercises, quizzes, and exams.
If a student has been out of school for one or more days, he/she should report to his instructors upon his return to inquire about making up the work. Students who know in advance that they will miss one or more classes should inform their instructors about their plans.

Consent for Recording of Class and Public Sharing of Instructor Material:

University Policy S12-7 (http://www.sjsu.edu/senate/docs/S12-7.pdf) requires students to obtain instructor's permission to record the course: Common courtesy and professional behavior dictate that you notify someone when you are recording him/her. You must obtain the instructor's permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material. Course material cannot be shared publicly without instructor's approval. You may not publicly share, or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor's consent.

Academic Integrity:

It is the aim of the faculty of SJSU to foster a spirit of complete honesty and a high standard of integrity. The University Academic Integrity Policy S07-2 at http://www.sjsu.edu/senate/docs/S07-2.pdf requires you to be honest in all your academic coursework. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The attempt of students to present as their own any work that they have not honestly performed will be considered a violation.
During quizzes and exams, communication with other individuals via any means is strictly prohibited without the express permission of the instructor. Violations will be met with the full impact of SJSU's academic integrity policy and procedures.

Religious Holy Day:

A student who intends to observe a religious holyday should make that intention known in writing to the instructor prior to the absence.

Students with Disabilities:

Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructor's office hours.
Please note instructors are not allowed to provide classroom accommodations to a student until proper confirmation from Student Disability Services has been provided. Presidential Directive 97-03 at https: /sjsu.edu/president/docs/PD_ 1997-03.pdf requires that students with disabilities requesting accommodations register with the Accessible Education Center (AEC) at http: /www.sjsu.edu/aec to establish a record of their disability.

Program Information

Diversity Statement:

At SJSU, it is important to create a safe learning environment where we can explore, learn, and grow together. We strive to build a diverse, equitable, inclusive culture that values, encourages, and supports students from all backgrounds and experiences.

Teaching Assistants:

This course has a learning assistant and an lab instructors, and a grader. The learning assistants are here to help you during in-class exercises and during the lab. The lab instructors will introduce the labs and work together with the learning assistants to help you learn the material. The grader is to help grade your assignments.

Remarks:

Teaching assistants are not here to debug your programs. Teaching assistants are here to support you in figuring out how to debug your programs on your own.

Course Goals

Course Description:

Intermediate concepts of Java: Classes, Inheritance, Polymorphism, Memory management, Exceptions

Introductory concepts of Data Structures: Stacks and queues, recursion, lists, dynamic arrays, binary search trees. Iteration over collections. Hashing. Searching, elementary sorting. Big-O notation. Standard collection classes. Weekly hands-on activity.

Course Format:

The course is delivered in person.

All students are required to have access to a wireless laptop (running MACOS or Windows), with a camera and microphone, upon which you can install the required software. You will need it for all classes, labs, and exams. The technology used will include Canvas, programming in Java, and an IDE (Integrated Development Environment).

On Fridays, there will be a lab. The lab will begin with a quiz and then students will progress through a programming activity working in small groups. To receive credit for the lab, your group will participate in a short exit interview or an exit quiz addressing questions from both the lab and the quiz with the lab

instructor. **Missing more than two lab sessions will result in removal from the course or grade F.** In case of not attending the lab due to legitimate excuse with proof document such as physician notes, instructor need to be notified before the lab section begins to make alternate arrangements. The student can make up for a missed lab by attending lab instructor's office hours to complete the exit interview and receive the grade.

Canvas:

It is the student's responsibility to check canvas and announcements regularly. For help with using Canvas, contact eCampus Program Mailbox **ecampus@sjsu.edu**.

Course Learning Outcomes (CLOs)

Upon successful completion of this course, students will be able to:

1. Use and work with basic structures such as linked lists, stacks, queues, binary search trees, and iterators.
2. Implement Java classes that embody data structures.
3. Use pre-existing implementations such as the Java Collections framework.
4. Make relative estimates of the running times of alternative algorithms using Big-O analysis.
5. Formulate and test for pre-and post-conditions.
6. Distinguish between different types of program defects and understand how testing and debugging are used to correct them.
7. Implement simple sorting algorithms such as Insertion Sort and Selection Sort.
8. Implement the Sequential Search and Binary Search algorithms.
9. Implement simple recursive algorithms such as binary tree traversal.
10. Work competently with commonly used tools for software development.
11. Create custom data structures when appropriate pre-existing classes are not available

Course Materials

Required Textbook:

zyBook : CS 46B: Introduction to Data Structures
zyBook ISBN: 979-8-203-97239-2

Purchase Instructions:
1. Click any assignment link in Canvas and go to the subscription website.
   (Important: Do not go directly to the zyBooks website and create a new account)
2. Subscribe the zyBook according to the instructions of subscription website.

Course Requirements and Assignments

The course is delivered in person.

All students are required to have access to a wireless laptop (running MacOS and Windows), with a camera and microphone, upon which you can install the required software.

You will need a wireless laptop for all classes, labs, and exams.

The technology used will include Canvas, programming in Java, and an IDE (Integrated Development Environment)

Lecture:
Students are expected to attend lectures and participate in class activities, discussions, surveys, etc.

Homework:
Weekly Homework will be assigned and must be submitted based on the due date. Grade deduction may apply to late submissions.

Lab:
The lab projects are an opportunity to put the concepts learned in lecture into practice and to improve students' Java programming.

There will be a lab on Friday.

Usually, students will finish during the allotted time. Lab projects will be completed in pairs.

if you miss or submit inadequate lab work more than twice, you will fail the course.

If you missed or submitted inadequate lab work two times, you must schedule a meeting with the instructor.

To receive credit for the lab, your group will participate in a short exit interview addressing questions from both the lab and the quiz with the lab instructor or learning assistant.

Remarks:
If you cannot attend the lab due to illness or verifiable emergence, please notify both the lab instructor and professor before your lab section begins. You need to provide proof document such as physician's note in order to be able to have make-up lab.

Quizzes:
There may be weekly quizzes throughout the semester.
The quizzes are designed to help students stay on top of the material and illustrate areas of confusion for both students and the instructor
Makeup quiz will only be given in cases of illness or verifiable emergency with proof document such as physician's note.

Midterm Exams:
Midterms will only be given during class time.
Makeup midterm exams will only be given in cases of illness or verifiable emergency with proof document such as physician's note.

Midterm exam dates in this syllabus are approximate and are subject to change.

Final Exam:
The final exam will be cumulative.
Makeup final exams will only be given in cases of illness or verifiable emergency with proof document such as physician's note.
OR
if a student has more than two final exams within a 24 hour period and notifies the instructor 2 weeks before the last class meeting with proof document such as exam schedule.

Technology:
Students are required to have a laptop with a camera and built- in microphone.
If you do not have access to a laptop, SJSU has a free equipment loan program available for students.
You will need a reliable WIFI connection to attend class.

Per University Policy S16-9, success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally three hours per unit per week) for instruction, preparation/studying, or course-related activities, including but not limited to internships, labs, and clinical practice. Other course structures will have equivalent workload expectations as described in the syllabus.

Grading Information

Grade Evaluation

Homework	**15%**
Lab Exam 1	**10%**
Lab Exam 2	**10%**
Lab Works	**10%**
Quiz	**5%**
Exam 1	**15%**
Exam 2	**15%**
Final Exam	**20%**
Total	**100%**

Grade Percentage Breakdown

100% - 97.00%	**A+**
96.99% - 94.00%	**A**
93.99% - 90.00%	**A-**
89.99% - 87.00%	**B+**
86.99% - 84.00%	**B**
83.99% - 80.00%	**B-**
79.99% - 77.00%	**C+**

76.99% - 74.00%	C
73.99% - 70.00%	C-
69.99% - 67.00%	D+
66.99% - 64.00%	D
63.99% - 60.00%	D-
below 60.00%	F

No incomplete grades will be given.
No late submission of assignments will be accepted.

University Policies

Per University Policy S16-9 (PDF) (http://www.sjsu.edu/senate/docs/S16-9.pdf), relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance,
counseling, and other resources) are listed on the Syllabus Information (https://www.sjsu.edu/curriculum/courses/syllabus-info.php) web page. Make sure to visit this page to review and be aware of these university policies and resources.

Course Schedule

Remark: This schedule is subject to change with fair notice

Lecture: Tuesday & Thursday 1:30pm – 2:45pm			Lab section – Friday 1:30pm – 2:45pm		
Week	Date	Topics	Lab	Date	Lab activity
Week 0	1/23	Introduction Prerequisite Check Syllabus	W0	No Lab 1/24	No Lab

Week 1	1/28 & 1/30	Syllabus Intro to Java Classes and Methods	W1	1/31	Classes and Methods
Week 2	2/4 & 2/6	Classes and Methods Inheritance	W2	2/7	Inheritance
Week 3	2/11 & 2/13	Generics, Converting and casting	W3	2/14	Converting and Casting
Week 4	2/18 & 2/20	I/O & Exceptions	W4	2/21	I/O and exceptions

Week 5	2/25 & 2/27	I/O & Exceptions	W5	2/28	JUnit tests and exceptions
Week 6	3/4 & 3/6	Recursion	W6	3/7	Recursion
Week 7	3/11 & 3/13	Review on 3/11 Exam 1 on 3/13	W7	3/14	Lab Exam 1
Week 8	3/18 & 3/20	Big O Sorting search	W8	3/21	Sort 1&2
Week 9	3/25 & 3/27	Memory management Linked List	W9	3/28	Linked List (1)
Week 10	4/8 & 4/10	Linked List	W10	4/11	LinkedList (2)

Week 11	4/15 & 4/17	Stack Queue Trees	W11	4/18	Stack
Week 12	4/22 & 4/24	Trees BST Custom collection	W12	11/25	Trees
Week 13	4/29 & 5/1	Hash Tables Sets Collections,	W13	5/2	BST Custom Collection
Week 14	5/6 & 5/8	Review on 5/6 Exam 2 on 5/8	W14	5/9	Lab Exam 2
Final Exam	5/20	May 20, 2025 Tuesday 1:00-3:00 PM			

Important Dates from SJSU 2025 Spring Calendar

2025	
Mon, Jan 20	**Dr. Martin Luther King, Jr. Day - Campus Closed** **Advance Registration Ends** **Last Day to Drop for 100% Refund**
Tue-Wed, Jan 21-22	**Registration Closed**
Thu, Jan 23	**First Day of Instruction** **Late Registration Begins on MySJSU after 7am**
Mon, Feb 3	**Waitlist Ends**
Tue, Feb 4	**Permission number is required to add a class**
Tue, Feb 18	**Last Day to Drop Classes without a "W" Grade and Last Day to Add Classes via MySJSU** **Last Day to Submit Audit| Credit/No-Credit Option Request** **Last Day to file Excess Units Petition** **Last Day to submit Instructor Drops**
Wed, Feb 19	**Enrollment Census Date (No Enrollment allowed)**
Thu, Feb 20	**Late Add Post Census Request Requirement begins** **Late Drop/ Semester Withdrawal Petition Requirement begins: Undergraduate, Graduate**
Fri, March 21	**Graduation Application Deadline to Qualify for Priority Registration for Undergrads**
Mon-Fri, March 31 - April 4	**Spring Recess - no classes**
Mon, March 31	**Cesar Chavez Day - Campus Closed**
Thu, April 22	**Last Day to File Late Drop/ Semester Withdrawal Petition: Undergraduate, Graduate** **Last day to submit Late Enrollment Post Census for current semester**
Mon, May 12	**Last Day of Instruction** **Last Day to Complete Coursework for "Incomplete Grades"**