

Syllabus: CS401 Advanced Studies I

This course is an introductory course in data structures. This course provides theories of how data structures can be implemented of software development. Topics include ADT, array, stack, queue, linked list, recursion, binary trees, heap, search, graph, and sorting algorithms. The student will build a complex project using the programming techniques and data structures taught in the class. Appropriate software engineering techniques are introduced, including object-oriented design, programming and testing.

Instructor: Dr. Michael Y. Choi

Email: choiy@iit.edu

Web Page: IIT Course Blackboard

Office Hours: Before or after class

Office Location: SB105B or online

Appointment is required for before class session

You must cover your face when you enter the professor's office

Prefer to have an online office hour manner

TA (lab instructor)

TBA

Email: @hawk.iit.edu

Office: Online

Office hour: TBA

Class schedule

Lecture W 18:45 – 20:25 SB111

Lab F 18:45 – 20:25 TA leads labs

L01 – SB112J

L02 – SB112E

L03 – SB112F

* All lab materials submit to BB Assignment tab by each assignment due date, midnight US CDT

* Everyone must take weekly labs (if not registered, must do)

* Without labs, you cannot pass this course

Email Guideline: Use @hawk.iit.edu account only to send.

***** Include class number in the subject field. *****

e.g. "Subject: CS401: your subject"

Use auto forward to your preferred personal email address in case.

Textbooks:

For lectures:

Nell Dale, Daniel T. Joyce, Chip Weems:

Object-Oriented Data Structures using Java, 4th Ed., 2018, Jones and Bartlett,
ISBN 13: **978-1-2840-8909-7**

**** You may use earlier edition with your own risk**

**** Older editions are not 100% same but not 100% different ****

No lab book: TAs will use lab material files every time.

Prerequisites: CS201 or pass the CS401 placement test

At least beginner level of JAVA programming is required.

If you have fluent C/C++ programming skill, you can move to JAVA.

Project: A JAVA programming project with topics of the course

Grading:

- Project: 20%
- Labs: 20% (Each lab weighs equivalently)
- Midterm 25%
- Final 30%
- Quiz 5%

Grading Scale:	CS401 for Graduate	Undergrad (i.e. IPRO)
	$90 \leq A \leq 100\%$	Same
	$80 \leq B < 90\%$	Same
	$70 \leq C < 80\%$	Same
	No D grade	$60 \leq D < 70\%$
	$E < 70\%$	$E < 60\%$

* If final exam is lower than 70%, "A" grade may not be qualified.

Exam Failure: The instructor reserves the right to assign a failing semester grade to any student who fails more than 1 exam, or whose exam scores do not average a passing grade. Or a poor performed student should accept extra study work to pass this course.

Academic Honesty: Any indication of copying lab (including previous semester work) or project work or any behavior during exams that could be considered copying or cheating will result in an immediate zero on the assignment/exam for all parties involved. In addition, a failing grade (E) in the course will be assigned, and the student's advisor/department and the Dean will be notified. Cheating on assignments is defined to be copying from someone else or providing someone else copies of your answers. **DO NOT show your assignments and programming work to anyone else!** You may answer questions on labs or project homework asked by other students. **Please read IIT Code of Academic Honesty policy carefully.** <https://web.iit.edu/student-affairs/handbook/fine-print/code-academic-honesty>
Academic integrity is absolutely important to be successful in your future.

No late assignments will be accepted unless you get earlier instructor or TA's permission. A student needs to get a permission from the instructor and/or TA in advance with proper written evidence why cannot submit on time. In an emergency case, a prior report with an adequate evidence material may be allowed.

Course Outline:

- Introduction Data Structure, OO Programming techniques, Intro Software Engineering
- Classes, Objects, and applications

- ADT (Abstract Data Types)
- Dynamic Memory, ADT
- Single & Double Linked Lists
- Stacks, Big-O, Strings
- Queues: Array, Linked List
- Inheritance
- Software project management strategies
- Recursion: Linked List Implementation.
- Binary Search Trees
- Heaps & Sorts
- Maps
- Graphs
- Hashing
- Design & Review, Real world software project models
- Algorithms vs. real world software, SE tips, tasks to understand, etc.

Laboratory

The ability that will be the most critical to your job when you graduate is your ability to program. The labs are designed to give you experience that you cannot gain from reading a book or attending lectures. Thus, it is required that you attend your assigned lab section each week.

Complete to Lab: Bring the following materials to lab with you each week:

- The laboratory assignment
- Finish your lab and review by your TA
- Or submit to BB by deadline (TA will assign) for online section

Submissions: Use class blackboard and directly demonstrate to your TA during lab sessions. All code files for lab assignments shall be turned in via a soft copy (BB) and via a live demonstration to your lab instructor.

NOTE: If you have to miss a lab with any urgent/unavoidable issue (illness or business travel), please notify the lab instructor (TA) immediately to get approval for excuse before the lab session. Lab instructor usually excuse one time and let you reschedule the submission. You may have to bring reasonable proof of your absence in order not to apply a late submission penalty. If too urgent to notify your TA before lab starts, **bring the evidence to get permission after the situation. Without a reasonable proof of document does not qualify to get waive.**

Grading: Programming is like riding a bike: you cannot learn it by memorizing a book – it takes practice! The lab section is to let you experiment with the concepts in a structured environment. The standards for the labs are designed to reflect effort, form, and results. For good form, use proper indentation, self-documenting code and comments, and an efficient coding style. For good results, ensure your code is properly tested and works for all conditions.

**** This course is not only a programming course. All programming/source code implementation/compiling/debugging must be done by yourself. If you don't complete them by yourself, your learning will not be successful.**

Project

The project is designed to give you experience putting together a larger project that involves multiple classes and objects. The project is designed to be fun - hopefully you will enjoy working on it! It is important that you learn how to schedule your time accurately to meet schedules in the work place. It is also important that you test thoroughly in order to avoid delays and problems later in the project. The lab instructor(s) may not point out all coding mistakes in your assignments – they will point out errors in testing however, and improvements in your coding style.

The project assignments will be announced in class and posted on the class BB. The schedule on the class web page will list when the project assignments are due.

Submissions: Submit your project package (softcopy) to the class blackboard.
No resubmission is allowed after the original project is submitted.

Important Schedules

Midterm exam: **8th week in the class** (October 13th)

Final exam: **IIT Final Week Wednesday schedule**

**** No make up exam schedule in any situation****

**** If no one has conflict, exam may start at 6:45 PM.**

Project submission Due: 1 week before the final (detail will be posted in the project description)

