CIS 351-Data Structures (Credit: 3)

Course Syllabus

Fall 2025

Welcome Message

Included a welcome message

Welcome to CIS351-Data Structure course. I'm Prof. Rahman, and I've designed this course to help you achieve the learning objectives with confidence and clarity. I genuinely care about your learning, growth, and success — not just in this class, but throughout your entire academic journey. Over the next 15 weeks, I look forward to learning with you and from you as we explore the world of data structures, one of the most important topics of computing discipline, together.

Course Information

Lecture Meeting Times and Locations

Section M001 (Loc: Link Hall room 160): TuTh 09:30PM - 10:50AM
Section M004 (Loc: Lyman Hall room 132): MonWed 08:00AM - 09:20AM

Lab Meeting Times and Locations

Section M002: Wed 09:30AM - 10:25AM (Loc: CST Ctr 1-230)
Section M003: Wed 10:35AM - 11:30AM (Loc: CST Ctr 1-230)
Section M005: Wed 11:40AM - 12:35PM (Loc: CST Ctr 1-230)
Section M006: Wed 12:45PM - 01:40PM (Loc: CST Ctr 1-230)

Course staff information

Professor Information
Name: Dr. Farzana Rahman (frahma02@syr.edu)
Help hours: Posted in Blackboard
Office: 3-177B CST

Teaching Assistant Information
TA's information and help hour details will be posted in BB.

Note: The professor reserves the right to change any aspect of the syllabus/grading criteria/schedule/homework/delivery methodology, if needed to meet the course objectives.

Textbook

We will use two books in this course.

1. Based on previous semesters' students experiences, Zybook have been very highly rated as a primary tool for preparation and success in this course. Hence, during the first 6 weeks, we will heavily rely on the following Zybook.

   - **Roman Lysecky and Adrian Lizarraga, Programming In Java with zyLabs**. Follow these steps to subscribe to this book:
     1. Sign in or create an account at learn.zybooks.com
     2. Enter zyBook code SYRCIS351RahmanFall2025
     3. Subscribe

   A subscription is $89 (Bookstore price $80). Students may begin subscribing on Aug 04, 2025 and the cutoff to subscribe is Dec 08, 2025. Subscriptions will last until Jan 09, 2026. All students are required to register for this service using their SU NetID (email address). That is how I will be reconciling points for zybook reading related grades in Blackboard.

   Note: If you need to subscribe through Bookstore, the ISBN to order this book from SU bookstore is: 979-8-203-02339-1. They will give you access key that you can use to subscribe.

2. Pat Morin, Open Data Structures (Java edition).
   Available **(free)** online at http://opendatastructures.org/

Note: Additional recommended reading, in PDF format, may be posted in blackboards.

Course Prerequisites

- ECS 102, CIS 252, CSE 283

LMS, Course page, Communication, Attendance

included detailed info on how to access course

Course page: https://blackboard.syr.edu/ (accessible with your SU NetID).
This class will use the Blackboard Learning Management to house the syllabus, course content, links to external course materials, assignments, labs, exams, feedback, discussion threads, and grades. Note: When submitting materials to the University's Blackboard, the LMS is on Eastern Time. It is recommended that students check their blackboard announcement and email routinely to ensure up-to-date communication.

Attendance and Misc.: I trust each of you will - (1) follow Syracuse University's rules and health related guidelines; and (2) communicate with me if you run into a situation where you cannot keep up with the coursework.

Course Overview

The **goal** of this course is to cover the design principles, behavior, implementation, and effeciency of different types of data structures and their use in various computing applications. After taking this course, students will be able to:

Updated the course learning objectives

1. Identify and use suitable data structures for different computing and engineering problems.
2. Design, implement, and apply core linear data structures — arrays, linked lists, stacks, queues, and their Java-based implementations.
3. Design, implement, and apply non-linear data structures — trees (binary, HEAP, AVL), graphs, with emphasis on traversal, searching, and modification operations.
4. Apply algorithm analysis to select the efficient data structure for solving various computing and engineering problems.
5. Explain and compare algorithms complexities to inform the design and implementation of various data structures.
6. Design and implement a variety of algorithms for searching and sorting, including linear search, binary search, insertion sort, selection sort, merge sort, quicksort, and heap sort.
7. Design, implement and apply appropriate data structures for secure software applications.

Catalogue Description

Abstract data structures, algorithm analysis, arrays, lists, trees, binary search trees, priority queues, graphs, utilizing data structures for security-related applications.

Deatil Course Objectives

A details of learning objectives are provided in https://farahman.github.io/objective.html.

Learning Activities and Assessment Details

included this whole section on inclusive and student-centered engagement policies

Engagement Methods

In this course, everything we do is designed with your learning, growth, and success in mind. We'll approach our work with a growth mindset — believing that skills and understanding can always improve with effort, and feedback. Our activities are built on two guiding principles:

1. Multiple ways to show what you know: We all know that everyone learns differently, so we'll use a variety of assessment approaches, both low-stakes and higher-stakes, to give you many opportunities to demonstrate your understanding. Together, we'll explore weekly reading assignments, hands-on lab sessions, programming project, small-group activities, and periodic exams that help you demonstrate your mastery of key topics.

2. Staying engaged to help you thrive: Learning works best when we're actively involved, so we'll weave in strategies that keep our class connected and energized. We'll have a buddy system for support, quick "exit tickets" to reflect on each day's learning, note-taking partners, one-minute summaries, and other techniques to help you stay engaged and ready to grow.

Assessment Methods

updated to multiple forms of flexible assessment

Here are more details of different assessment mtehods we will use in this course:

1. Reading Activities: Many of our lecture day will have reading assignment in Zybook, which is recommended to be completed by the class time. However, the official deadline is Saturday of each week. Zybook activities submitted beyond 24 hour of the deadline are not accepted and are not eligible for grades.

2. In-class Activities: There will be various in-class activities to reinforce learning of various topics learned during the lecture. You are expected to submit the work during class time in Blackboard or online platform.

3. Lab Assignments: Lab session on Wednesday will either be used to introduce a hands-on lab assignment demonstrating some new skills or to serve as a help session. Lab assignments are usually due Tuesday midnight. Labs submitted beyond 24 hour of the deadline are not accepted and are not eligible for grades.

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4. Individual Homework: Homework assignments, primarily programming assignments focusing on the implementation of data structures are to be done INDIVIDUALLY. These provide students with extended opportunities to get programming practice. HW are usually due on Friday midnight. There will be a homework due every 1 to 2 weeks. More details about late submission of HW are provided in upcoming Subsection.

5. Exams: There will be three exams in. All exams are mandatory. Exams allow you to demonstrate your understanding and mastery of the course concepts. Exam dates will be announced at the very beginning of the semester and will be reminded two weeks before the exam.

> If your exam2 score is higher than exam1, the higher score will be used for exam1. Similarly, if your exam3 score is higher than exam2, the higher score will be used for exam2.

The following assessments will make up the indicated percentages of your grade:

Zybook Reading Activities	8%
In-class activities	7%
labs	15%
Homework	25%
Exam1	15%
Exam2	15%
Exam3	15%

ATTENTION: I understand that sometimes unavoidable circumstances—like illness, emergencies, or other life events—may lead to absences or missed work. To help ease that pressure, I will drop a few of the lowest grades in each assessment category listed above. This way, an occasional tough week won't define your overall performance, and you can focus on steady growth throughout the semester.

Remark on Weekly Logistics

- On rare occational lecture days, I may need to be away for a professional commitment — such as presenting research at a conference or participating in teaching related professional development. I'll always let you know in advance, and you'll have a recorded lecture to watch for that day, followed by a related activity or quiz to keep us on track.
- If something unexpected comes up and I can't make it to class, the EECS office will let you know or post a note on the classroom door by class time. I'll also share an announcement on Blackboard so you're always in the loop.

Details on Homework

There will be numbers of homework, i.e., programming assignments, during the course of the semester. Programs will be graded on the basis of correctness, documentation, and overall code quality. Unless otherwise stated, homework must be entirely your own work. You may only request help from a course instructor or a teaching assistant. Any help that you receive from any source must be noted in COVER SHEET, which is submitted with each homework.You may discuss general course content with other students and friends. However, when doing so you must never refer to code written for a homework, either directly or indirectly. **You can find a detailed summary of academic integrity policies later in this syllabus in a dedicated section.**

Late Submission

We all know that sometimes life happens—and when it does, flexibility, understanding, and compassion matter. We each learn in our own way and face unique life circumstances, so I want you to feel supported in this class. If you ever find yourself struggling to keep up with course deliverables or deadlines, please reach out to me as soon as you can. Together, we can find strategies that help you meet your needs while still achieving the goals of the course.

To help you keep up with the course related deadlines, we have integrated a default 24-hour extension policy for all lab assignments, zybook reading assignments, and homework. Lab and zybook reading assignments are not accepted for grading beyond the default 24-hour extension period, without legitimate documented reason.

Homework Late Submission

You're always welcome to submit homework any time before or by the deadline, but I encourage you not to wait until the very last moment — giving yourself a little extra time can make the

process far less stressful. In case you need to submit any HW later, you are able to submit it for reduced points with the following policy:

$\mathcal{P}(n)$ % **points** of the total points will be subtracted from your obtained score for n late days, where $n \in \mathbb{Z}^+$ (i.e., $n = 1, 2, \ldots$). $\mathcal{P}$ will be calculated as follows:

$$\mathcal{P}(n) = \begin{cases} 2^n \ \% & \text{if } 1 \leq n \leq 6 \\ 100 \ \% & \text{if } n > 6 \end{cases}$$

Suppose, a programming assignment is worth of a total $\mathcal{T}$ points and your obtained score is $\mathcal{S}$. For late submission, your final score can be $\textbf{max}(0, \mathcal{S} - \frac{\mathcal{P} \times \mathcal{T}}{100})$ for n late days.

Technically, first late day will begin right after the exact time of the deadline. However, to deal with any last moment technical issue on the submission site, you all will have an automatic **24-hour extension/grace period**. For example, assume a submission is due at Thursday 11:59 PM (in EST); if you manage to submit within the next 24 hours (i.e., Friday 11:59 PM (EST)), your submission will NOT be considered as a late submission. After this 24-hours grace period, n will become 2 and your submission will be considered as late; there will be no excuse, such as 1 min or 1 hr late. **Note: Late submission may NOT be allowed for some HW (e.g., last HW)**.

ATTENTION: If you are not able to submit a HW within the 7-day period following the deadline, you are welcome to submit that HW during anytime of the semester, before the last class, with professor's permission. That HW will be graded on a maximum of 50%.

Grading Summary

Final grades are based on a simple scale as shown below: Let G be a student's final score. Then G will be computed based on the following table.

Total Score	Letter Grade
$G \geq 93$	A
$90 \leq G < 93$	A-
$85 \leq G < 90$	B+
$80 \leq G < 85$	B
$75 \leq G < 80$	B-
$70 \leq G < 75$	C+
$65 \leq G < 70$	C
$60 \leq G < 65$	C-
$55 \leq G < 60$	D
$0 \leq G < 55$	F

No **Incomplete** grade will be provided without valid reason. Violations of academic integrity override the foregoing table and could result in a F grade. Finally, the instructor reserves the right to change this grading scale.

Note: As part of the regular ABET accreditation process we will collect samples of your submission like labs/homeworks/exams to present to the ABET evaluators.

Tentative Schedule of Topics

Week	Topic
1	Intro to Java
2	OOP, Classes, Objects, Methods, Array
3	Arraylist, Wrapper classes, Inheritance, Polymorphism
4	Interface, Abstract Classes,
5	Growth function analysis, Generics, **EXAM1**
6	Single and Double Linked List
7	Stack, Queue, Circular Queue
8	Application of Stack, Queue
9	Recursion, Tree, **EXAM2**
10	Tree Traversal, BST+Searching
11	Graph+Sorting, BFS, DFS
12	Hashing, Hashtable
13	Blockchain, Heap
14	Review, **EXAM3**

add late policy for HW

Course-specific Policies

Academic Drop Deadlines

As part of our efforts to track satisfactory academic progress, the Academic Drop Deadline and the Financial Drop deadline will both occur on September 15, 2025, for the fall semester.

Use of Class Meeting Time

clear message on class usage time

- I encourage you all to come prepared to actively participate in each class. This is the best way to engage in your learning.
- Our collective goal is to utilzie the class meeting times to learn, and discuss technical topics.
- If you have any grading concerns, suggestions on course policy, or anything else to discuss, I welcome you to come and join my office hours.

Extension Policy

Keep in mind that fairness is a primary consideration for granting extensions. Extension request will only be considered beyond the late policies outlined earlier in this syllabus.

- Submit a doctor's statement, describing the condition and why the extension is necessary.
- Other special cases - you must provide an official statement supporting the case is serious enough to cause problems in fulfilling your academic requirement.

Email Policy clear expectation for email and discussion board usage

- For any technical questions/errors/bugs, post in **"Blackboard Discussion"** first. There is a much higher chance that you will get an answer from your peers or the TAs before I can get to the question.
- Emails are to be used only for the following purposes:
  - For other course related issues (e.g., about grading, scheduling one-on-one meetings, or containing sensitive information)
  - Asking logistical questions (i.e., date/time of exams, meeting times, due dates, etc.)
  - Notifying emergency situations
- You must use your official university email address.
- All emails should have the prefix **"CIS351"** (without the quotes) in the subject line. A best effort attempt will be made to respond to emails within 48 hours on weekdays during normal working hours.
- Few things you should keep in mind throughout the semester are:
  - You are required to check your SU email at least once a day for any class updates.
  - Emails will not be answered on weekends.
  - No meetings will be accepted/scheduled on the day when homework is due.
  - No questions on the discussion board will be answered on the day when homework is due or over the weekend.
  - For questions with long and complicated answers, like help about solving an exercise or debugging a program, I or the TA may ask you to attend office hours.
  - Finally, for any homework, it is recommended that you **Start Early, Plan Carefully!**, so you can get help from the teaching team on time.

Attendance and Participation

Attendance during lecture meeting is mandatory and sometimes we will have in-class problem solving activities, which are graded and counted as your attendance. If you miss a class-activity, you will NOT have the chance to make it up in any other way. If you miss a lecture, it is your own responsibility to obtain all course content and oral announcements presented in that lecture. It is also your responsibility to go through the covered material on your own and check with your class buddy group to identify and cover the missed topics.

introduced course buddy grouop

Course Buddy Group

To help you stay connected and supported in this class, you'll form a small "Course Buddy Group" of four classmates during the first week. These groups are meant to be your go-to circle for sharing notes if someone misses class, reminding and encouraging each other to attend regularly, and offering support with questions or studying together. Think of it as a built-in community—you'll have a few classmates you can count on, and they can count on you. If you do have to miss a session, please reach out to your group first for updates before following up with me. This way, we can all help each other succeed and make the course more enjoyable.

Grade Appeal

Questions regarding any graded work must be brought to the attention of the TA via EMAIL within 7 days after the grade is posted. Otherwise, after seven days the grade of the submitted work will be considered final.

Grade Posting

Your grade data are recorded in the Blackboard system. It is your responsibility to check them regularly, and inform us promptly when any discrepancies are found. The teaching team will periodically post Blackboard announcement to remind you to check and verify your grades.

Missed Exams

There are no extensions or make-ups for the exams, except for a university-accepted reason. If a student misses exams without a university accepted reason, a zero grade will be assigned. If a student misses the exam1 or exam2, the exam3's will be used to replace the missing grade(s). Students are responsible for contacting the instructor as soon as possible if they are unable to take any exams due to university accepted reasons.

Discussion Board Communication Policy

Online discussions and questions on - technical content, error troubleshoot and debugging - will be handled through the discussion forum in Blackboard, not via email. A best effort attempt will be made to respond to posts within 24 hours on weekdays during normal working hours. All students are encouraged to respond as well. To ensure a timely response, you should not wait to ask questions until the night before a submission deadline or until the day of the deadline.

Code Reuse

Professional coders reuse coding solutions available on the internet after understanding and customizing to the specific context. Whenever they reuse the code, they cite it. You MUST do the followings, if you to plan use a snippet of code that you find on the internet: 1. Try to understand how code works and why it should be used. It is good to add detailed comments.
2. Use only necessary piece of code, revise it and make the code your own. DO NOT copy paste.
3. Include a reference and cite the source.
Failing to follow above process MAY lead to a form of plagiarism.

School-Life Conflict

Many students obstacles to their education as a result of work of family obligations or unforeseen personal difficulties. If you are experiencing challenges throughout the term that are impacting your ability to succeed in this course, please reach out to me or your TA immediately so that we can work tother to form a plan for your success in this course. If you are unable to attend my or the TA's student help hours, please email me to setup time that works for you or arrange a meeting by zoom.

AI Usage Policy by Instructor

I, as the instructor, may use generative AI tools to help develop course materials such as [e.g., discussion prompts, in-class activity idea]. When I do, I take full responsibility for reviewing and verifying all AI-generated content to ensure it is accurate, appropriate, and aligned with our learning objectives. All final course materials represent my professional judgment about what will best support your learning.

Academic Integrity and Honesty

As a pre-eminent and inclusive student-focused research institution, Syracuse University considers academic integrity at the forefront of learning, serving as a core value and guiding pillar of education. Syracuse University's Academic Integrity Policy provides students with the necessary guidelines to complete academic work with integrity throughout their studies. Students are required to uphold both course-specific and university-wide academic integrity expectations such as crediting your sources, doing your own work, communicating honestly, and supporting academic integrity. The full Syracuse University Academic Integrity Policy can be found by visiting class.syr/edu, selecting, "Academic Integrity," and "Expectations and Policy."
Upholding Academic Integrity includes the protection of faculty's intellectual property. Students should not upload, distribute, or share instructors' course materials, including presentations, assignments, exams, or other evaluative materials without permission. Using websites that charge fees or require uploading of course material (e.g., Chegg, Course Hero) to obtain exam solutions or assignments completed by others, which are then presented as your own violates academic integrity expectations in this course and may be classified as a Level 3 violation. All academic integrity expectations that apply to in-person assignments, quizzes, and exams also apply online. Students found in violation of the policy are subject to grade sanctions determined by the course instructor and non-grade sanctions determined by the School or College where the course is offered. Students may not drop or withdraw from courses in which they face a suspected violation. Any established violation in this course may result in course failure regardless of violation level.

Use of artificial intelligence: Based on the specific learning outcomes and assignments in this course, artificial intelligence is permitted on the following: lab assignment, and Reading Assignment to refine understanding of assignments. See each assignment handout and relevant instructions for more information about what artificial intelligence tools are permitted and to what extent, as well as citation requirements. If no instructions are provided for a specific assignment, then no use of any artificial intelligence tool is permitted. Any AI use beyond that which is detailed in course assignments is explicitly prohibited except when documented per-

mission is granted. **Finally, for CIS 351 course, you must do the following:**
1. Every student MUST read and sign a copy of the course Honor Policy within two week from the first day of class. This document details your obligations to behave with academic integrity.
2. You MUST read and comply with the academic integrity related policies posted here: https://farahman.github.io/aipolicy.html
3. For each programming assignment, if you have used any specific AI tool or have taken help from anyone other than the teaching staff, you MUST disclose it in the cover sheet.

Occasionally, your solutions to programming assignments will be checked using an automatic system, MOSS (http://cs.stanford.edu/~aiken/moss/) for determining the similarity of programs. MOSS is a plagiarism detection tool which can identify similarity matching among written computer programs. A high similarity matching found due to plagiarism will also be considered as a violation of academic integrity in this course.

University Attendance Policy (including Absence Notification)

Attendance in classes is expected in all courses at Syracuse University. It is a federal requirement that faculty promptly notify the university of students who do not attend or cease to attend any class. Faculty will use Early-Semester Progress Reports and Mid-Semester Progress Reports in Orange SUccess to alert the Registrar and Financial Aid Office on non-attendance. For more information visit:
Faculty: http://registrar.syr.edu/faculty-staff/non-attendance/
Students: http://registrar.syr.edu/students/non-attendance/
If a student is unable to participate in-person or virtually for an extended period of time (48 hours or more), the student may request an absence notification from their home school/college Dean's Office or through Student Outreach and Retention (SOaR) office. Instructors will be notified via the "Absence Notification" flag in Orange SUccess.
Barnes Center at the Arch (Health, Counseling, etc.) staff will not provide medical excuse notes for students. When Barnes Center staff determine it is medically necessary to remove a student from classes, they will coordinate with SOaR case management staff to provide appropriate notification to faculty through Orange Success. For absences lasting less than 48 hours, students are encouraged to discuss academic arrangements directly with their faculty.
Additional information may be found at Student Outreach and Retention: Absence Notifications (https://experience.syracuse.edu/soar/support-services/absence-notifications/).

Diversity and Disability

Syracuse University values diversity and inclusion; we are committed to a climate of mutual respect and full participation. There may be aspects of the instruction or design of this course that result in barriers to your inclusion and full participation in this course. I invite any student to contact me to discuss strategies and/or accommodations (academic adjustments) that may be essential to your success and to collaborate with the Center for Disability Resources (CDR) in this process. If you would like to discuss disability-accommodations or register with CDR, please visit (https://disabilityservices.syr.edu/). Please call (315) 443-4498 or email disabilityresources@syr.edu for more detailed information. The CDR is responsible for coordinating

disability-related academic accommodations and will work with the student to develop an access plan. Since academic accommodations may require early planning and generally are not provided retroactively, please contact CDR as soon as possible to begin this process.

Discrimination or harassment

Federal and state law, and University policy prohibit discrimination and harassment based on sex or gender (including sexual harassment, sexual assault, domestic/dating violence, stalking, sexual exploitation, and retaliation). If a student has been harassed or assaulted, they can obtain confidential counseling support, 24-hours a day, 7 days a week, from the Sexual and Relationship Violence Response Team at the Counseling Center (315-443-4715, 200 Walnut Place, Syracuse, New York 13244-5040). Incidents of sexual violence or harassment can be reported non-confidentially to the University's Title IX Officer (Sheila Johnson Willis, 315-443-0211, titleix@syr.edu, 005 Steele Hall). Reports to law enforcement can be made to the University's Department of Public Safety (315-443-2224, 005 Sims Hall), the Syracuse Police Department (511 South State Street, Syracuse, New York, 911 in case of emergency or 315-435-3016 to speak with the Abused Persons Unit), or the State Police (844-845-7269). I will seek to keep information you share with me private to the greatest extent possible, but as a professor I have mandatory reporting responsibilities to share information regarding sexual misconduct, harassment, and crimes I learn about to help make our campus a safer place for all.

Mental Health and Well-being

Well-being and mental health are significant predictors of academic success. It is critical to take care of yourself physically and emotionally and to effectively navigate stress, anxiety, and depression. Please familiarize yourself with the range of resources the Barnes Center provides (https://ese.syr.edu/bewell/) and seek out support for mental health concerns as needed. Counseling services are available 24/7, 365 days, at 315-443-8000.

Faith Tradition and Observation

Syracuse University's Religious Observances Policy (https://policies.syr.edu/policies/university-governance-ethics-integrity-and-legal-compliance/religious-observances-policy/) recognizes the diversity of faiths represented in the campus community and protects the rights of students, faculty, and staff to observe religious holy days according to their traditions. Under the policy, students are given an opportunity to make up any examination, study, or work requirements that may be missed due to a religious observance, provided they notify their instructors no later than the academic drop deadline. For observances occurring before the drop deadline, notification is required at least two academic days in advance. Students may enter their observances in MySlice under Student Services/Enrollment/My Religious Observances/Add a Notification.

Faculty Use of Student Academic Work

Educational use of student work: I intend to use academic work that you complete this semester for educational purposes in this course during this semester. Your registration and continued enrollment constitute your permission.