Northeastern College of Engineering

INFO 6205: Program Structures and Algorithms

Course Information
Course Title: Program Structure and Algorithms
Course Number:INFO 6205
Term and Year: Fall 2024
Credit Hour: 4
CRN: 20827
Course Format: Lecture - In-Person

Instructor Information
Full Name: Tessema Mengistu
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Office Hours: Monday : 12:00 - 2:00 PM (Zoom) and Thursday: 10:30 AM - 12:30 PM (Zoom)

Instructor Biography
https://people.cs.vt.edu/mengistu/

Teaching Assistant Information
Full Name: Yogitha Adapa
Email Address:adapa.yo-at-northeastern-dot-edu
Office Hours:Wednesday - 11:00 AM to 1:00 PM and Friday - 11:00AM to 1:00 PM

Course Prerequisites
Graduate Level CSYE 6200 Minimum Grade of B- or Undergraduate Level INFO 5100 Minimum Grade of B- or Graduate Level INFO 5100 Minimum Grade of B-Course Description

Presents data structures and related algorithms, beginning with a brief review of dynamic memory allocation. Discusses the fundamental data structures in detail, including the abstract representation, supporting algorithms, and implementation methods. Focuses on understanding the application of the abstract data structure and the circumstances that affect implementation decisions. Covers lists, stacks, queues, trees, hash tables, and graphs. Covers recursion and searching and sorting algorithms in detail. Emphasizes data abstraction and encapsulation in code design. Explores external storage structures.

Course Learning Outcomes
1) Comprehension of Program Structures and Algorithms: By the end of the course, students will be able to explain fundamental program structures, data structures, and algorithms. They will have the ability to analyze diverse computational challenges using various methods and tools.

2) Proficiency in Algorithmic Problem Solving: Upon completion of the course, students will be proficient in designing, implementing, and analyzing algorithms for tasks such as searching, sorting, and recursion.
3) Application of Data Abstraction and Encapsulation Principles: Emphasizing modular and reusable programming practices, students will develop proficiency in applying principles of data abstraction and encapsulation in code design.

Required Tools and Course Textbooks.
Textbook: Data Structures and Abstractions with Java, Frank M. Carrano and Timothy M. Henery, 5th edition, Pearson.

Course Schedule/Topics Covered.

Week	Date	Topic(s)	Textbook Reading Chapters	Assignments	Notes
week 1	09/04 -09/08	Review: Basics of OOP using Java	Java Interlude 1, 5, 7, 8	Project 1	
week 2	09/09 - 09/15	Efficiency of Algorithms	Ch. 4		
week 3	09/16 - 09/22	Linear Data Structures (Stack and Queue, Linked List vs. Array)	Ch. 5 - 8		
	Sunday, September 22				Project 1 Due
week 4 & 5	09/23 - 10/06	Review: Recursion ; Trees	Ch. 9 Ch. 24 & 25	Project 2	
week 6	10/07 - 10/13	Binary Search Trees	Ch. 26 & 28		
week 7	10/14 - 10/20	Midterm Exam			
	Sunday, October 20				Project 2 Due
Week 8	10/21 - 10/27	Priority Queues & Heaps	Ch. 27	Project 3	
week 9	10/28 - 11/03	Sorting	Ch. 15 & 16		
week 10	11/04 - 11/10	Hashing	Ch. 22 & 23		
	Sunday, November 10				Project 3 Due
week 11 & 12	11/11 - 11/24	Graphs	Ch. 29 & 30	Project 4	
	Monday, 11/11	Veterans Day - No Class			
week 13	11/25 - 12/01	Thanksgiving Break No class			
week 14	12/02 - 12/04	Balanced Search Trees	Ch. 28		
	Wednesday, December 04				Project 4 Due
Final Exam	xx	xx			

Assignment Grading

Material	Weight	Note
Programming Projects(4)	**60%**	
Midterm Exam	**15%**	
Final exam	**25%**	

Grading Scale

	87-89.9% B+	77-79.9% C+	
95-100% A	84-86.9% B	74-76.9% C	
90-94.9% A-	80-83.9%B-	70-73.9% C-	69.9% or below F

Attendance/Late Work Policy

Attendance Policy

Students registered in MGEN courses (INFO, CSYE, and DAMG) are allowed **a maximum of 2 absences per course, with 3 or more absences resulting in an automatic 'F' for that course.** Students are expected to inform their instructors of any absences in advance of the class; if a student is sick long-term or experiences a medical issue that prevents class attendance, it is strongly encouraged that they speak with their Academic Advisor (coe-mgen-gradadvising@northeastern.edu) to learn more about the Medical Leave of Absence. Should a student anticipate being unable to attend 3 or more classes, they should discuss their situation with their Academic Advisor to explore other types of leave in accordance with the University's academic and global entry expectations. International students should review the Office of Global Services webpage to understand their visa compliance requirements.

Teaching Assistants (TAs) or Instructional Assistants (IAs) will be present at each class to collect student attendance.

Late Work Policy

Students must submit assignments by the deadline in the time zone noted in the syllabus. Students must communicate with the faculty prior to the deadline if they anticipate work will be submitted late. Work submitted late without prior communication with faculty will not be graded.

End-of-Course Evaluation Surveys
Your feedback regarding your educational experience in this class is particularly important to the College of Engineering. Your comments will make a difference in the future planning and presentation of our curriculum.

At the end of this course, please take the time to complete the evaluation survey at **https://neu.evaluationkit.com**. Your survey responses are **completely anonymous and confidential**. For courses 6 weeks in length or shorter, surveys will be open one week prior to the end of the courses; for courses greater than 6 weeks in length, surveys will be open for two weeks. An email will be sent to your Northeastern University Mail account notifying you when surveys are available.

Academic Integrity
A commitment to the principles of academic integrity is essential to the mission of Northeastern University. The promotion of independent and original scholarship ensures that students derive the most from their educational experience and their pursuit of knowledge. Academic dishonesty violates the most

fundamental values of an intellectual community and undermines the achievements of the entire University.

As members of the academic community, students must become familiar with their rights and responsibilities. In each course, they are responsible for knowing the requirements and restrictions regarding research and writing, examinations of whatever kind, collaborative work, the use of study aids, the appropriateness of assistance, and other issues. Students are responsible for learning the conventions of documentation and acknowledgment of sources in their fields. Northeastern University expects students to complete all examinations, tests, papers, creative projects, and assignments of any kind according to the highest ethical standards, as set forth either explicitly or implicitly in this Code or by the direction of instructors.

Go to http://www.northeastern.edu/osccr/academic-integrity-policy/ to access the full academic integrity policy.

MGEN Student Feedback
Students who would like to provide the MGEN unit with anonymous feedback on this particular course, Teaching Assistants, Instructional Assistants, professors, or to provide general feedback regarding their program, may do so using this survey: https://neu.co1.qualtrics.com/jfe/form/SV_cTIAbH7ZRaaw0Ki

University Health and Counseling Services
As a student enrolled in this course, you are fully responsible for assignments, work, and course materials as outlined in this syllabus and in the classroom. Over the course of the semester if you experience any health issues, please contact UHCS.

For more information, visit https://www.northeastern.edu/uhcs.

Student Accommodations
Northeastern University and the Disability Resource Center (DRC) are committed to providing disability services that enable students who qualify under Section 504 of the Rehabilitation Act and the Americans with Disabilities Act Amendments Act (ADAAA) to participate fully in the activities of the university. To receive accommodations through the DRC, students must provide appropriate documentation that demonstrates a current substantially limiting disability.

For more information, visit https://drc.sites.northeastern.edu.

Library Services
The Northeastern University Library is at the hub of campus intellectual life. Resources include over 900,000 print volumes, 206,500 e-books, and 70,225 electronic journals.

For more information and for education specific resources, visit https://library.northeastern.edu
Network Campus Library Services: Northeastern University Library Global Campus Portals

24/7 Canvas Technical Help
For immediate technical support for Canvas, call 617-373-4357 or email help@northeastern.edu

Canvas Student Resources: https://canvas.northeastern.edu/student-resources/

For assistance with my Northeastern e-mail, and basic technical support:
Visit ITS at https://its.northeastern.edu
Email: help@northeastern.edu
ITS Customer Service Desk: 617-373-4357

Diversity and Inclusion
Northeastern University is committed to equal opportunity, affirmative action, diversity, and social justice while building a climate of inclusion on and beyond campus. In the classroom, members of the University community work to cultivate an inclusive environment that denounces discrimination through innovation, collaboration, and an awareness of global perspectives on social justice.

Please visit http://www.northeastern.edu/oidi/ for complete information on Diversity and Inclusion

Title IX
Title IX of the Education Amendments of 1972 protects individuals from sex or gender-based discrimination, including discrimination based on gender-identity, in educational programs and activities that receive federal financial assistance.

Northeastern's Title IX Policy prohibits Prohibited Offenses, which are defined as sexual harassment, sexual assault, relationship or domestic violence, and stalking. The Title IX Policy applies to the entire community, including male, female, transgender students, faculty, and staff.

In case of an emergency, please call 911.

*Please visit **https://www.northeastern.edu/ouec** for a complete list of reporting options and resources both on- and off-campus.*