

Course Description

Algorithm development using pseudo languages, basic program structures, program design techniques, storage and manipulation of basic data structures like arrays, stacks, queues, sorting and searching and string processing. Linked linear lists. Trees and multilinked structures.

4 Credit Hours

Course Pre-Requisites

COP 3504 or COP 3503 with minimum grade of C, COT 3100, and MAC 2234, MAC 2312, MAC 3473 or MAC 3512.

Course Objectives

This course covers implementation and use of data structures for use in problem solving. In particular, lists, stacks, queues, trees, tables and graphs will be covered. Algorithm development including recursive techniques will be covered. Sorting algorithms will be covered. Students will learn to solve problems using data structures and choose how those data structures will be implemented.

By the end of the semester, students should be able to

- Choose and implement data structures for solving problems based on their functions and situational appropriateness of application
- Choose an algorithm for solving a problem based on its computational complexity and appropriateness of application
- Use an abstract data type to describe a data structure

Materials and Supply Fees

N/A

Professional Component (ABET):

This course is used to assess program outcomes for these ABET criteria:

a) an ability to apply knowledge of mathematics, science and engineering

e) an ability to identify, formulate, and solve hardware and software

computer engineering problems, accounting for the interaction

between hardware and software

k) an ability to use the techniques, skills, and modern engineering tools

necessary for computer engineering practice

Recommended Textbook and Software

- Data Structures and Algorithm Analysis in C++
- Mark Allen Weiss
- 4e, 2014
- 978-0-13-284737-7

Open Data Structures and Algorithms

<https://opensa-server.cs.vt.edu/ODSA/Books/Everything/html/>

Attendance Policy, Class Expectations, and Make-Up Policy

Exams

Exams are held in CAR 0100 during a class period and require the use of Respondus Lockdown Browser.

Exams may be made up when student has an excused absence.

Excused absences must be consistent with university policies in the undergraduate catalog (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx> (Links to an external site.)Links to an external site.) and require appropriate documentation.

Programming Assignments

Programming assignments require the use of C++. They will be compiled with g++ and your program must compile using this compiler.

You may work together but your code must be your own.

Programming Assignments may be turned in late with a penalty of 10% per day up to 4 days late.

Quizzes

Quizzes use the Stepik platform. Go to stepik.org and create an account. Use your name as it is in Canvas and make your profile public. This is how we will find your submissions and grade your work.

Join our course.

<https://stepik.org/course/50935/syllabus>

Quizzes may not be turned in late.

Questions on grading of Exams, Quizzes and Programming Assignment must be brought up within 1 week of receiving a grade. After 1 week, the grade is set.

Communication:

Every effort will be made to communicate all necessary information via Canvas. There will also be communications made in lecture. If something is said in lecture, it is considered to be communicated to the class. Therefore, if you miss class you may miss information.

The instructor will answer emails. However, emails that ask a question directly addressed in class or on Canvas may not be answered.

There will be a slack channel created for the class. It is forbidden to post code into the slack channel. The existence of a slack channel does not mean that TAs or the instructor will be available all the time. TAs and the instructor will be available often, but not all the time.

TopHat

Extra Credit: up to 5% extra credit for participating in class via TopHat.

TopHat costs \$20/semester (no matter how many classes).

Join code 250510

I will take attendance using location services. You must consent to TopHat accessing your location in order to receive credit. The point of this is class participation. To participate, the student must be in the room listening to the lecture

Communication Protocol

We will be using Slack throughout the semester. [Here is the link to join.](#)

Policy for Discussions- Be Nice, Be Helpful

1. Treat your classmates with civility and respect. Don't attack anyone and no discussion of controversial topics on channels.
2. If you have a question regarding code or content, always post it on a public channel. Don't be hesitant however simple is the question. You will be surprised how many students have the same question but are hesitant to ask.
3. Try to answer questions posted by your course mates if possible and help them. This is helpful to form a vibrant community.
4. If you are answering questions posted by your course mates use the reply feature to create threads in slack.

Evaluation of Grades

Assignment	Percentage of Final Grade
Programming Assignments (2)	28%
Hashing Analysis	10%
Quizzes (11)	20%
Exams (2)	20%
Final Exam	19%
Surveys and Reflection	3%
	100%

Grading Policy

Percent	Grade	Grade Points
93 - 100	A	4.00
90.0 – 92.9	A-	3.67
87 - 89.9	B+	3.33
83 - 86.9	B	3.00
80.0 – 82.9	B-	2.67
77 - 79.9	C+	2.33
73 - 76.9	C	2.00
70.0 – 72.9	C-	1.67
67 - 69.9	D+	1.33
63 - 66.9	D	1.00
60.0 – 62.9	D-	0.67
0 - 59.9	E	0.00

More information on UF grading policy may be found at:
<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Commitment to a safe and inclusive learning environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination.

It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu

- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@ufl.edu

Sexual Discrimination, Harassment, Assault, or Violence

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Students Requiring Accommodations

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://www.dso.ufl.edu/drc>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu/evals>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

University Honesty Policy

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see:
<http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html>

Campus Resources:

Health and Wellness

U Matter, We Care:

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. <https://lss.at.ufl.edu/help.shtml>.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/>.

Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. <https://teachingcenter.ufl.edu/>.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. <https://writing.ufl.edu/writing-studio/>.

Student Complaints Campus: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.

On-Line Students Complaints: <http://www.distance.ufl.edu/student-complaint-process>.

Date	Topic	Readings	Assignment
May 13	Intro, Computational Complexity, Algorithm Analysis	Weiss Chapter 2	
May 15, 17	Lists, Stacks and Queues	Weiss Chapter 3	
May 21, 23	Recursion		May 21 – Stacks Coding Quiz
May 25, 29	Trees, Tree Traversals, Binary Search Trees	Weiss 4.1-4.4	May 28 – Recursion Coding Quiz
May 31, June 3	AVL Trees, Splay Trees	Weiss 4.5-4.7	
June 5, 7	B-Trees, Red Black Trees	Weiss 4.6, 4.7, 12.2	June 4 - Tree Traversal Coding Quiz
June 10, 12	Review		June 11 – AVL Tree Coding Quiz
June 14	Exam 1		
Jun 18, 20	Sets and Maps	Weiss 4.8	No class – videos available
June 22	Hashing	Weiss Chapter 5	Programming Assignment 1 Due Feb 24
March 11	Heaps	Weiss Chapter 6	
Mar 13, 15	Sorting	Weiss Chapter 7	Quiz 6 – Heaps Coding Question Quiz 7 - Sorting Coding Question
Mar 18, 20, 22	Graph Traversals, Graph Implementation, Topological Sort	Weiss 9.1-9.2	Hashing Analysis Due Mar 24
Mar 25, 27, 29, Apr 1	Shortest Paths, Minimum	Weiss 9.3-9.5	Quiz 8 - Graph Traversal Quiz

	Spanning Trees, Network Flow		
Apr 5	Introduction to NP Completeness	Weiss 9.7	Quiz 9 - Graph Algorithm Coding Question
April 8	Greedy Algorithms	Weiss 10.1	
Apr 10, 12 Apr 15	Review		Exam 2 Quiz 10 - Greedy Algorithms Coding Question
Apr 17, 19	Dynamic Programming	Weiss 10.3	Programming Assignment 2 Due April 21
Apr 22, 24	Review		Quiz 11 - Dynamic Programming Coding Question
May 2			Final Exam 5:30-7:30 pm
			CAR 0100