



OTTERBEIN
UNIVERSITY

Syllabus

COMP 2100-01

Data Structures

Fall Semester 2024

Basic Information

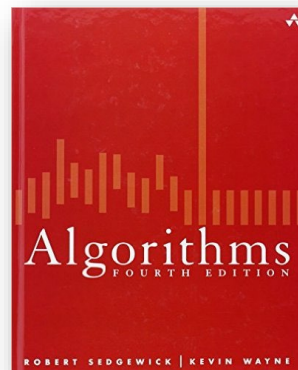
Credits: 4.0
Time: **MWF** 10:20 - 11:15 a.m. (Lecture)
TR 11:30 a.m. - 12:50 p.m. (Lab)
Location: Point 113
Prerequisites: COMP 2000
Corequisites: MATH 1230

Instructor Information

Name: Dr. Barry Wittman
E-mail: wittman1@otterbein.edu
Office: Art & Communication C123
Phone: (614) 823-2944
Office hours: **MWF** 9:00 – 10:15 a.m.
MWF 1:45 – 2:45 p.m. (in C142)
W 4:00 – 5:00 p.m.
TR 10:00 – 11:30 a.m.
TR 2:00 – 4:00 p.m.
and by appointment

Text Book

Robert Sedgewick and Kevin Wayne
Algorithms
4th Edition, 2011, Addison-Wesley Professional
ISBN-10: 032157351X
ISBN-13: 978-0321573513



Course Catalog Description

Introduction to fundamental data structures and computing algorithms within an object-oriented context. Principles of data abstraction and representation are examined. Additional topics include specification, design, use, and implementation of abstractions; recursion; and intuitive analysis of algorithms.

Student Learning Outcomes

By the end of the course, students will be able to:

- I. Apply knowledge of computing and mathematics appropriate to the discipline, including common data structures and basic algorithms
- II. Analyze a problem and identify and define the computing requirements appropriate to its solution, applying concurrency when applicable
- III. Design, implement, and evaluate a computer-based system, process, component or program to meet desired needs
- IV. Function effectively on teams and using software engineering principles to accomplish a common goal
- V. Develop proficiency in many advanced features of Java
- VI. Evaluate computational complexity for algorithms and programs
- VII. Apply and implement fundamental abstract data types including:
 - a. Linked lists
 - b. Stacks
 - c. Queues
 - d. Binary search trees
 - e. Multiway trees
 - f. Graphs
 - g. Hash tables
- VIII. Explain and apply recursion
- IX. Implement and evaluate the relative merits of common sorting and searching methods
- X. Explain a variety of graph problems and related efficiency issues

Program Learning Outcomes

The Computer Science major has a set of 10 Student Learning Outcomes (SLOs). Work in this course contributes to the following SLOs:

2. Students can methodically solve algorithmic problems in at least one programming language.
3. Students develop an understanding of the recurring themes of abstraction and computation.
4. Students are proficient in a software development paradigm.
6. Students can independently learn and apply new methods and tools.

Method for Determining Course Grade

The final grade for this course will depend upon the grades and scores earned on course components weighted as follows:

- 36%** Four equally weighted team projects
Tentative due dates:
 - Project 1:** 09/20/2024
 - Project 2:** 10/11/2024
 - Project 3:** 11/08/2024
 - Project 4:** 12/06/2024
- 14%** Homework assignments
- 5%** Pop quizzes
- 30%** Two equally weighted midterm exams
 - Exam 1:** Tentatively scheduled for 09/23/2024
 - Exam 2:** Tentatively scheduled for 11/11/2024
- 15%** **Final Exam:** Friday, 10:15 a.m. - 12:15 p.m., 12/13/2024

Grades will be computed by rounding numerical percentages to the nearest integer and applying the following table:

A	93-100	B-	80-82	D+	67-69
A-	90-92	C+	77-79	D	60-66
B+	87-89	C	73-76	F	0-59
B	83-86	C-	70-72		

Grades for each project, assignment, quiz, and exam will be recorded in [Brightspace](#). Students may compute their current average by using these scores with the weights listed above.

Attendance and Participation Policy

Attendance is expected of every student at every lecture. Students are responsible for all content covered in class as well as assigned book chapters. Students should come to class with their text books, having read the material to be covered that day. Students who have not prepared for class may be asked to leave. Due to their nature, pop quizzes cannot be made up.

Students are expected to attend in-person class sessions as indicated on the schedule. However, if a student is not feeling well, that student should not come to the in-person class session that day. To catch up on work, students should visit the instructor during office hours or another scheduled meeting time.

Except in the case of documented emergencies, exams cannot be made up afterwards. For excused absences, students must arrange to take the exam *before* the normally scheduled time. Arrangements must be made with the instructor at least two weeks prior to the scheduled time.

Students are expected to maintain an attitude of respect at all times toward their colleagues, the equipment, and the instructor. Students are expected to refrain from using technology for non-course related purposes during class time and will be penalized 1% of the final grade for each occurrence. Students who use offensive language or are otherwise disruptive of the classroom will be asked to leave.

Expectations for Out-of-Class Work

Projects

All projects are team projects in this course. For each project, all students must form teams of two (or three in the case of an odd number of students). Students are permitted to select their own teams; however, no two students may partner up for more than one project. In other words, each team will be different for each project. Students should select their teams through [Brightspace](#).

Teams are responsible for dividing their workload. Except under extreme circumstances, all members of the team will receive the same grade for each project. The files for each project should be zipped up and uploaded using [Brightspace](#) before the due date. If the project is late, the group will receive a score of 0. **If the project does not compile, the group will receive a score of 0.**

Projects will be graded based on the following criteria:

1. **Correctness:** Finding the right answer
2. **Efficiency:** Efficiently using processor and memory resources
3. **Formatting:** Displaying the right answer according to instructions
4. **Style and Documentation:** Producing readable code with appropriate comments

Late projects will not be accepted, with the following exception. Each student has 3 grace days. These grace days may be used together or separately to allow a 24-hour extension of the project deadline per grace day. A team wishing to use a grace day must inform the instructor via e-mail *before* the normal deadline. Both students in the team will have the appropriate number of grace days deducted. If the members of a team have different numbers of grace days available, the team will be treated as if it has the maximum number of grace days of any of its members.

Under no circumstances should a team member look at the code written by another team. Tools will be used to detect code similarity automatically.

Homework Assignments

All homework assignments are to be done individually. Each assignment must be uploaded into [Brightspace](#) before 11:59 p.m. on the due date. Assignments submitted after the deadline will not be accepted. Programming assignments will receive a score of 0 if they do not compile. Written (non-programming) assignments must be turned in as a LaTeX, Word, or PDF document. LaTeX is strongly encouraged and will earn extra credit. Grace days are not available for assignments.

Academic Honesty

Academic dishonesty includes cheating, complicity, falsification, multiple submission, and plagiarism. To understand better what each of these kinds of dishonesty entails, see the full statement on Academic Dishonesty in the [Campus Life Handbook](#), beginning at the bottom of page 47.

All cases of suspected Academic Dishonesty will be forwarded to Academic Affairs. To learn more about the process, see the above cited section of the [Campus Life Handbook](#). Academic Dishonesty may result in automatic failure of the assignment or the course itself, or even suspension or expulsion proceedings.

You are plagiarizing when you:

- Copy material from a source without using quotation marks and proper citation.
- Follow the movement of the source, substituting words and sentences but keeping its meaning, without citing it.
- Lift phrases or terms from a source and embed them in your own prose without using quotation marks and proper citation.
- Borrow ideas (that are not common knowledge) from a source without proper citation.
- Turn in a paper wholly or partially written by someone else.

If you are uncertain about when and how to cite sources, or what is allowable in completing assignment and exams, please speak with your professor.

All projects must be completed by the students in a given team, without assistance from anyone other than the instructor. Homework assignments must be completed individually. Students can discuss the course material with each other, but all work must be done individually or within the team, as appropriate. For projects, exams, homework, and all other activities in the course, students are expected to act according to the official policy on academic dishonesty and the highest standards of personal integrity.

Although generative AI tools like ChatGPT are impressive, they must not be used to write any code or solve any analytical problems that a student is expected to turn in for this class. ChatGPT may be used to explain existing code or to suggest improvements for code but only *after* the project or assignment in question has been turned in. Students who do not write code themselves have missed the opportunity to gain the skills of logical problem solving and translation to a formal programming language that are essential for computer scientists.

For the first infraction of academic honesty in this course, the instructor will seek a penalty of a 0 for the project, assignment, or exam in question and a reduction of a full letter grade in the final grade. If a second infraction occurs, the instructor will seek the maximum penalty possible under the University's regulations.

Statement on Credit Hour Definition/Expectation for Student Work

For each credit hour of classroom or direct faculty instruction, students are expected to engage in two hours of out-of-class work (readings, homework, studying, project preparation, etc.). A three-credit-hour course requires six hours per week of out-of-class work. These expectations are the same for blended and online courses, with some or all of the direct faculty instruction occurring online instead of in a classroom.

Nondiscrimination at Otterbein

Otterbein University is committed to providing a welcoming environment free from unlawful discrimination. To this end, the University prohibits any form of discrimination against any person on the basis of race, color, sex, gender, pregnancy, religion, creed, marital status, partnership status, age, sexual orientation, gender identity, gender expression, national origin, disability, military status, or any other legally protected status in its programs and activities. All Otterbein faculty and staff share in the responsibility to create a safe learning environment for all students and for the campus as a whole. Students who believe they have been discriminated against should contact the Office of Human Resources, (614) 823-1805 / hr@otterbein.edu.

Any person may report sexual harassment, sexual violence, dating violence, and stalking by contacting Julie Saker, Deputy Title IX Coordinator at (614) 823-1154 / jsaker@otterbein.edu.

If a student would prefer to share information about sexual harassment, sexual violence or discrimination to a *confidential* employee who does not have a reporting responsibility, they can contact the Counseling Center, (614) 823-1333 / counseling@otterbein.edu, or the WGSRC Peer Advocates, wgsrc@otterbein.edu.

Information about these policies can be found [here](#).

Disability Services

The University has a continuing commitment to providing access and reasonable accommodations for students with disabilities, including mental health diagnoses and chronic or temporary medical conditions. Students who may need accommodations or would like referrals to explore a potential diagnosis are urged to contact Disability Services (DS) as soon as possible. DS will facilitate accommodations and assist the instructor in minimizing barriers to provide an accessible educational experience. Please contact DS at DisabilityServices@otterbein.edu. More info can also be found [here](#). Your instructor is happy to discuss accommodations privately with you as well.

Counseling Services

Given the level of uncertainty in the world, many students might experience feelings of threat, fear, and uneasiness. For extra support – in the way of just being able to verbalize your feelings to an interested outsider, gaining some reassurance and validation of your feelings, making plans to move forward optimistically and safely – reach out to any staff. Otterbein staff want to provide not only respect but also verbal and emotional support and encouragement. The Counseling Center can be reached at (614) 823-1333. You can also call or text 988, the Suicide and Crisis Lifeline of Ohio, for 24/7 access to a mental health professional.

Academic Support Center

The Academic Support Center (ASC) helps students develop and strengthen the skills necessary to attain their academic goals. They support student learning and success through: tutoring, teaching, disability services, and academic coaching. Students will also find many useful resources on the [ASC Tips and Tools page](#). All services are free for Otterbein students. Their purpose is to help students be academically successful. Please contact them to request a tutor or learn more about the ASC by calling (614) 823-1610 or visiting the [ASC website](#).

Library Services

The Courtright Memorial Library provides a broad range of services and resources, from color printing and a game collection to 24/7 access to more than 220 scholarly databases and e-books [here](#). On-campus students can access in-person help, quiet study spaces, and open computer labs during the library's [open hours](#).

Students can also access the many e-textbooks on reserve by clicking the Course Reserves tab on the library [web page](#) or find help for a specific subject area by searching [LibGuides](#).

Need more help? Students can chat with a librarian by clicking the Ask Me tab on the right side of the library homepage. Students also may e-mail the library at library@otterbein.edu. For in-depth research help, make an appointment for a virtual research consultation with your [personal librarian](#).

Tentative Schedule

The following is a tentative schedule of the topics to be covered in each week. This schedule is subject to change as need dictates. Students will be informed of changes by the instructor in class. A schedule will be kept on the [course webpage](#).

Week	Starting	Topics	Chapters	Notes
1	08/26/24	Java, OOP, and generics	Notes, 1.1	
2	09/02/24	Complexity	1.4 , 1.2	Labor Day
3	09/09/24	Stacks and queues	1.3	
4	09/16/24	Linked lists	1.3	Project 1 Due
5	09/23/24	Recursion	Notes	Exam 1
6	09/30/24	Binary trees	Notes, 3.1	
7	10/07/24	Balanced binary search trees	3.2, 3.3	Project 2 Due
8	10/14/24	Hash tables	3.4	October Break
9	10/21/24	Graph Basics	4.1, 4.3	
10	10/28/24	Graph Algorithms	4.4, 6.2	
11	11/04/24	B-trees and Network Flow	6.4	Project 3 Due
12	11/11/24	Sorting	2.1, 2.2, 2.3	Exam 2
13	11/18/24	Heaps	2.4, 5.1, 5.2	
14	11/25/24	Strings	5.3	Thanksgiving
15	12/02/24	Review	All	Project 4 Due