

CSC 226: Software Design and Implementation Syllabus

Instructor Information

<p>Instructor: Dr. Scott Heggen Email*: heggens@berea.edu Slack: @heggens Office: CMIT 315 Office Hours: Daily 1:00PM - 2:00PM</p> <p>I am most easily reached by looking at my Outlook calendar and scheduling a meeting with me.</p>	<p>Class Meetings: CMIT 310 (Network & Security Lab) Section A: MWF 9:20 - 10:30 AM Section B: MWF 10:40 - 11:50 AM</p> <p>Evening Lab Hours: CMIT 316.1 (Immersive Tech Lab) Sunday through Thursday 7:00 - 9:00 PM Additional online support: Slack Channel</p> <p>Primary TAs: David Olorunpoju-Essang (lead) Julio Jijon Mahmoud Leghlimi</p>
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Course Information

In this course, students learn to design and implement software with an emphasis on object-oriented design. The course will include pseudocode, stepwise refinement, and testing for algorithm development. Other programming topics include data types, arrays, structures, functions, and files. Prerequisite: Any 100-level CSC course at Berea or permission of the instructors.

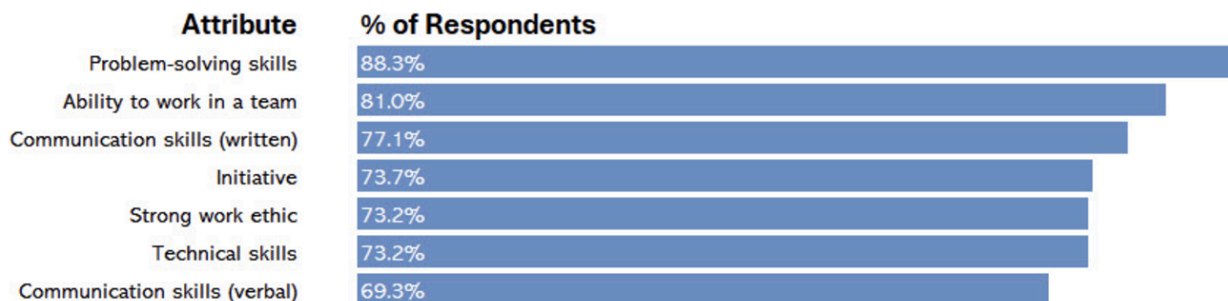
Learning Goals

By the end of this course, students should have developed proficiency in the following:

- **Big Ideas in Computer Science:** Reflect on the power and creativity of computation as well as the how and why computing enables innovation in other fields.
- **Problem-Solving:** Learn to analyze problems of increasing complexity, to break these problems down into smaller more manageable components, and to incrementally develop algorithmic solutions.
- **Data Handling:** Develop familiarity and comfort with commonly used data and programming concepts, operations and structures, such as flow of control, data types, branching, I/O, functions, methods, objects, classes, loops, and arrays.
- **Programming:** Read, understand, and be able to modify pre-existing code, and design and implement readable well-documented code using appropriate algorithms.
- **Documentation:** Appreciate the importance of creating well-commented and well-documented code so that it can be easily read, understood, and modified.
- **Teamwork:** Develop skill in working effectively on a team in pursuit of common goals.

You may notice that not all of these learning goals are technical. Employers responding to the National Association of Colleges and Employers (NACE) Association's Job Outlook survey¹ rated the following as the top skills employers look for in new hires:

Attributes Employers Seek on a Candidate's Resume



Resources and Texts

- **Course Websites:**
 - [Course Agenda](#) (Required)
- **Primary Text (Required):** B. Miller and D. Ranum. (2025_Spring_CSC_226) [How to Think Like a Computer Scientist, The Interactive Edition](#)
 - Sign-up for **2025_Spring_CSC_226** using **your Berea email address**
- **Supplemental Text (Optional):** Heggen, S. (2017) [How to Think Like a Computer Scientist, Berea College Edition](#)
- **Software:**
 - [Python 3](#) (required)
 - [PyCharm FREE COMMUNITY Edition IDE](#) (required; do not download the professional version)
 - [Git](#) (required)
 - [Github](#) (using your Berea email address)
- **Online Help:**
 - [Slack Channel](#)

Technology Expectations

The following policies are designed to guide students in how to be effective in a technology-rich environment.

- **Laptop and Software:** Each student is required to have an appropriately equipped laptop and software for class. Your Berea College-issued laptop is sufficient.
- **Communication:** Electronic communication programs are useful when used appropriately, so each student is required to use the course website, Moodle, Slack, and particularly *your Berea College email account* to facilitate communication outside of class. **I expect you to check your email daily, so if I email something on Monday, you should know it by Wednesday's class and it should not come as a surprise to you.**
- **Backups:** All students are expected to regularly backup their work, which includes assignments, quizzes and exams. We use Google Drive extensively in this class; learn [how to use it to back up](#) all of your work (for this and other classes). It will take you less than 30 minutes to set up, but it will save you YEARS of work when your computer crashes. Your normally-understanding instructor will not be sympathetic to your loss, as you have all the tools available to you to prevent such heartbreaking loss.

¹ <https://www.nacweb.org/talent-acquisition/candidate-selection/employers-want-to-see-these-attributes-on-students-resumes/>

- **Unapproved Technology:** The in-class use of unapproved technology will not be tolerated, and in certain cases will constitute a violation of academic honesty. For example, no games are ever acceptable, and communication tools, such as cell phones, email or instant messaging programs, are only acceptable when being used for course-related work. To help students appreciate the gravity of this policy, each in-class use of unapproved technology will result in a 1% reduction of the student's final grade or academic honesty action, when appropriate.
- **Plagiarism and Academic Honesty:** Plagiarism is the use of anyone else's work or ideas and claiming them as your own. It is a crime which is both easy to commit, and easy to avoid. Ideas taken from other people, including those from books, articles, websites, TAs, or your friend's homework need cited. The best way to avoid plagiarism is to **always cite ALL your sources!** If you are not sure whether or not to cite a source, **you should cite it!** Simply put, plagiarism is stealing because it constitutes theft of someone else's ideas. It is a serious offense, and Berea College takes it very seriously. **Plagiarism will not be tolerated!** At the first offense, the student will receive an F for that assignment. At the second offense, the student will fail the course. ALL offenses of plagiarism will be reported to the Director of Academic Services, as detailed in the Berea College Student Handbook.
- **External Resources and Artificial Intelligence:** Use of external resources including AI tools to **support** your learning in this course is encouraged. However, use of AI tools to **supplant** your learning is academic dishonesty. Just like asking a friend for help is okay, while asking a friend for their answers is not okay, asking an AI tool for help in understanding a difficult concept is okay, while asking an AI tool to solve a question for you is NOT okay and will be treated the same as any other academic honesty violation. Finally, failing to cite when you use these tools is a guaranteed way to get academic dishonesty charges against yourself, so **always cite your sources!** Here are two examples of each case:

✗ Academic Dishonesty:

You: write me a python script to draw a zig zag pattern using turtles

AI: Certainly! Here's a Python script using the `turtle` module to draw a zigzag pattern:

✓ Appropriate:

You: help me debug this python code that should be drawing a zig zag pattern:

AI: Of course! Please provide me with the code you're having trouble with, and I

Course Material

Course material is structured in a way that it supports your learning of a particular skill, from the very basics to a level of expertise. Every activity we do in this course is mapped to an explicit category: quiz, teamwork assignment, homework assignment, final project, or exam. Each category aligns to Bloom's Taxonomy of Learning², a widely accepted model for teaching and learning, and described below.

² Bloom, B. S. (1956). *Taxonomy of educational objectives: The classification of educational goals: Cognitive Domain*. Longman.

Reading Quizzes

At the most basic level of Bloom's taxonomy of learning is **knowledge**, the ability to recall information. Quizzes are intended to build this most basic understanding. Before the start of the class every Monday and Friday, students will begin each new topic with a reading from our primary textbook. As you read, you will answer questions directly in the book which are designed to reinforce your understanding. These interactions are recorded and will make up 1/3 of your Reading Quizzes grade. Next, at the beginning of class on the subsequent Monday or Friday, students will take a quiz. The quiz will constitute 2/3 of your Reading Quiz grade.

Teamwork Assignments

At the next two levels of Bloom's taxonomy are **comprehension**, the ability to grasp the meaning of the material, and **application**, the ability to use the material in a new situation. Every Friday we assign a new teamwork assignment that you will work on for the following week. Teamworks are designed to take your learning from the reading and apply it to a basic problem. Teamwork assignments are completed in teams of two to four, depending on the assignment. Teamwork assignments are always an **in-class activity**, and you are rarely expected to complete the assignment outside of class. Each teamwork lasts one week, and extensions are not granted except in very rare exceptions. *Absences, regardless of the reason, will negatively impact your teamwork score, and significantly (33% per absence), as you are also impacting your partner(s) ability to complete the assignment by being absent.* We will use Google Drive extensively in teamwork assignments, so make sure you always have your laptop with you.

Homework Assignments

Homework assignments move us to the next two levels of Bloom's taxonomy, **analysis**, the ability to break an idea down into parts, and **synthesis**, the ability to reassemble parts back into a whole idea. In homeworks, I am expecting you to explore the idea from the teamwork assignment on a new, harder, more open-ended problem, and use the learning from other parts of the class to assemble your solution to the problem. You will need to be able to think independently on homework assignments. You are always encouraged to seek out help from others on homework, particularly from the evening lab, but also your classmates, the instructor, AI tools, and other outside resources that are NOT a solution to the problem. **However, you are also expected to give them credit for their assistance (through citations and acknowledgement in supporting materials and in your code).** Again, if you are unsure if you should attribute credit, do it! **If it was not your idea, do it!**

Final Project

The class will conclude with a final project, and explore Bloom's highest level, **evaluation**, which is the ability to judge the value of an idea for a given purpose. Your final project will require you to create a solution to a problem of your choosing, considering all the tools and ideas you've learned throughout the course, and evaluate their applicability to the problem. Details about the project will be announced approximately one month before the end of the semester. We will use the final exam period to demo all of the projects. Although you do not have an exam that day, you are expected to attend the final demo, and it will negatively impact your final project grade if you miss it. Plan accordingly, as there are no exceptions from attending the final demo!

Exams

The activities above *formulate* your learning. The two exams will *assess* that learning. The most likely, **tentative dates**, of the two exams are:

- **Exam 1:** Friday, February 28th, 2025
- **Exam 2:** Wednesday, April 16th, 2025

If you need accommodations, please make them before the exam, and through the Office of Disability & Accessibility Services, which I've included information about at the end of this syllabus.

Coding Interviews

The software engineering industry relies heavily on coding interviews to assess qualifications for a specific job. In many cases, these coding interviews are done live with an engineer at the company. The engineer will give you a problem to solve, and you will demonstrate your ability to use your computer science knowledge to solve that problem. You will have three coding interviews throughout the term. You will be able to start scheduling coding interviews with the professor starting in Week 5:

- Coding Interview 1: Weeks 5 through 8 (Monday, 02/03/25 through Friday, 02/28/25)
- Coding Interview 2: Weeks 10 through 13 (Monday, 03/10/25 through Friday, 04/04/25)
- Coding Interview 3: Weeks 14 through Finals Week (Monday, 04/07/25 through Friday, 05/01/2025)

Grading

For the benefit of the students in the class, all course grade computations are continually updated in Moodle by the instructor and/or teaching assistants, so students may check frequently on their in-progress course grade during the term. Moodle is an estimate of your grade; your final grade will closely reflect, but may not match perfectly, what is reported in Moodle.

Grading Weights & Scale

The [Berea College grading scale](#) makes clear that:

- An A represents excellent work,
- A B represents good work, and
- A C represents competent work

Most work that any of us do is competent. I will communicate with you regularly about where you stand in the course via Moodle, so that you can focus your efforts appropriately, however, you should always feel welcome to inquire about your grade.

Participation	5%
Quizzes	10%
Teamwork Assignments	10%
Homework Assignments	15%
Exams	20%

- An A is in the range of 90% to 100%
- A B is in the range of 80% to 89%
- A C is in the range of 70% to 79%
- A D is in the range of 60% to 69%
- An F is a grade of 59% or lower.

Coding Interview	20%
Project	20%

A plus or minus may be earned through exceptional attendance, teamwork, professionalism, collegiality, and participation. Questions regarding grades should never be directed at TAs, but instead always directed to the course instructor.

Diligent Student Bonus

Students who satisfy all of the following conditions by the end of the course will have their lowest exam grade dropped before their final grade is computed:

1. **Completeness:** You have completed ALL of the teamwork and homework assignments and the final project, even if some are late.
2. **Reliability:** You have not been excessively (i.e., more than two times) tardy or absent from class as defined by the class attendance policy below.
3. **Class Citizenry:** You have been a consistently constructive participant in the course and have not had any noted incidents of disruptive or disrespectful behavior, and have shown academic integrity.

The instructor reserves the right to raise the grades of students who have demonstrated significant improvement in their performance. This is at the sole discretion of the instructor, but a student is welcome to bring such possibilities to our attention.

Late Work Policy

Assignments are due at 11:55pm for every teamwork and homework assignment on the day listed in Trello. Because you have a week to complete each teamwork and homework, there are very few cases where extensions will be granted. However, I do understand how busy students are throughout the year, and there are cases when you need a little more time. As such, up to **two** times, you may use a one week automatic extension (i.e., no need to ask). Beyond these two extensions, none will be granted, and any late assignment will then be counted as a zero for the assignment.

Attendance Expectations

Class time is considered to be vital to success in this course. Attendance is expected at every class session. Students who come late, leave early, or fail to fully participate during the class will be considered absent for that portion of the period, and such partial absences will accumulate. The final grade may be lowered by one third of a letter grade (i.e., 3.33%) for each absence beyond the second. Furthermore, the teamwork assignment that was supposed to be worked on that day will be lowered by 33% for the day missed.

It is the responsibility of the student to contact the instructors about EACH absence from class. In most cases, this should be done via email, as soon as possible, and if at all possible, before the absence occurs. Students who miss class are held responsible for all of the material covered, assigned, and collected during their absence.

If you are sick with flu or COVID-like symptoms, the Center for Disease Control (CDC) recommends that you stay home for at least 24 hours after your fever is gone, except to get medical care, or for other necessities. Please do not come to class in-person if you exhibit these symptoms. If your symptoms are concerning to you,

seek medical attention immediately, and email your instructors after your checkup. Such absences will not count against your attendance grade, once proof of medical attention is provided.

Class Atmosphere

The members of this class constitute a learning community. Learning in such a community best takes place in an atmosphere in which both instructor and students act professionally. We all have biases, and those biases are not always intentional, but they still exist. An interesting study to test your own unconscious biases is available online from Harvard³. Being aware of your own biases, and acknowledging they exist, is the first step in ensuring we are all able to learn most effectively in this diverse class.

If at any time you have thoughts, comments, or suggestions about how the class atmosphere could be improved or made into one which is more supportive to your learning, please come to our office hours or drop me a note about it. I always welcome such suggestions.

Additional Support

Two opportunities for additional help exist. First, the Computer Science program maintains a Slack channel, where students are welcome to discuss all things CS in an online format, including asking questions related to courses. The primary thing to remember when using the Slack channel is to **never post solutions to problems** in the channel.

[Link to the Slack Channel](#)

The second method to seek additional help is through the Computing and Digital Crafts Lab, located in CMIT 316.1. The lab is open Sunday through Thursday from 7:00PM - 9:00PM.

Students are strongly encouraged to make use of the help available in the Evening Lab, the instructor's office hours, and the Slack channel. Best results are obtained trying to solve problems before asking for help, and students should be prepared to show what they have already tried. The only "dumb" question is the one that goes unasked.

Learning Accommodations

Berea College is committed to providing all campus community members with a learning and working environment that is free from discrimination, including sexual misconduct. As a faculty member, one of my responsibilities is to help create a safe learning environment on our campus. This includes being a Required Reporter. While I will seek to keep information you share private to the greatest extent possible, I am required to share information regarding sexual harassment and/or sexual misconduct with the Title IX Coordinator for the college. Students may speak to someone confidentially by contacting [Campus Christian Center](#) or [Counseling Services](#) or visit [Title IX Office](#) for more information.

Under Title IX of the Education Amendments of 1972, pregnant and parenting students may be afforded accommodations regarding their educational experience. If you believe that pregnancy or pregnancy-related conditions are likely to impact your participation in this course, please contact Berea's Title VII/IX Coordinator, Joslyn Glover, to discuss appropriate accommodations. She may be reached at gloverj@berea.edu or 859.985.3606.

³ <https://implicit.harvard.edu/implicit/takeatest.html>

