CSC 226: Software Design and Implementation Syllabus

Instructor Information

Instructor:: Jan Pearce **Email:** pearcej@berea.edu **Office:** Danforth Technology 102C **Office Hours:** Tues and Thurs 10am-10:50pm and by appointment	**Instructor**: Patrick Shepherd **Email**: shepherdp@berea.edu **Office**: Danforth Technology 102B **Office Hours:** Tues 12pm-2pm, Wed 11am-12pm, Thur 12pm-1pm and by appointment
Class Meetings: Monday, Wednesday, and Friday 9:20AM - 10:30 AM in DT 104	**Primary TAs**: Ahmed Abdulahi, Destiney McCoy & Lisandro Padron **Evening Lab Hours in DT 104** Sunday 7:00 - 9:00 pm Monday 7:00 - 9:00 pm Tuesday 7:00 - 9:00 pm Wednesday 7:00 - 9:00 pm Thursday 7:00 - 9:00 pm Additional online support: **Slack Channel #csc226**

* Email and Slack are typically good ways to reach us, but please also feel welcome to drop by our offices anytime the door is open.

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 the above learning goals are technical. Employers responding to the National Association of Colleges and Employers (NACE) Association's Job Outlook survey[1] rated the following as the top skills employers look for in new hires:

1. Problem-solving skills 91.2% of respondents
2. Ability to work in a team 86.3% of respondents
3. Strong work ethic 80.4% of respondents
4. Analytical/quantitative skills 79.4% of respondents
5. Communication skills -written 77.5% of respondents
6. Leadership 72.5% of respondents
7. Communication skills-(verbal 69.6% of respondents
8. Initiative 69.6% of respondents

Resources and Texts

- **Course Website**:
  - Course Agenda (Required)
- **Primary Text (Required)**: B. Miller and D. Ranum. (csc226-f21) *How to Think Like a Computer Scientist, Interactive Edition* sign-up for csc226-f21 using your Berea username and Berea email
- **Software**:
  - Python 3 (required)
  - PyCharm Community Edition IDE (required)
  - Git (required)
  - Github (required)

- **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 agenda website, Moodle, Slack, and particularly *your Berea College email account* to facilitate communication outside of class. **We expect you to check your email daily, so if we email something on Monday, you should know it well before 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 hours of work if your computer crashes. Your normally-understanding instructors will not be sympathetic to your loss, as you have all the tools available to you to prevent such heartbreaking loss.
- **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

[1] Key Attributes Employers Want to See on Students' Resumes (2020), National Association of Colleges and Employers, https://www.naceweb.org/talent-acquisition/candidate-selection/key-attributes-employers-want-to-see-on-students-resumes/

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 **cite ALL your sources, always**! 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.

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 Learning[2], a widely accepted model for teaching and learning, and described below.

Quizzes

At the most basic level of Bloom's taxonomy of learning is **knowledge**, the ability to recall information. Quizzes will include questions relating to the reading assignment for that day's lesson. Students will take these quizzes individually at the start of the class period. After everyone has completed taking the quiz individually, students will take the quiz again in groups, coming to consensus on the answers to each of the questions. Thus, evidence that you have engaged and retained the information you have read will be reflected in your quiz scores. By keeping track of group and individual scores separately, you will have measures of your ability to listen and to learn from others.

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. In teamwork assignments, you will take your learning from the reading and apply it to a simple, atomic problem. Teamwork assignments are, obviously, 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. If a large portion of the class does not finish an assignment by the end of a class period, that's okay. We'll continue in the next class. 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, We

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

are 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; they are never collaborative. You are always encouraged to seek out help from others on homework, particularly from the evening lab, but also your classmates, the instructor, and 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.

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**: Wednesday, October 6, 2021
- **Exam 2**: Wednesday, November 17, 2021

The exams are typically two parts: A written part, and a coding part. You will be expected to complete both in a single class period. If you need accommodations, please make them before the exam, and through the Office of Disability & Accessibility Services, which we've included information about at the end of this syllabus.

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.

Late Policy

Except when otherwise noted, assignments and teamworks are accepted after up to five days after the deadline, but are reduced by 20% per day. Thus, after 5 days late, they are no longer accepted. Note also that tardiness rounds up, so an hour late is considered a day late. Exceptions to this policy are made by the instructors on a case-by-case basis. TAs may not make such judgement calls, so please do not ask them to do so.

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. We 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	15%
Teamwork Assignments	15%
Homework Assignments	20%
Exams	30%
Project	15%

- An A- or an A is in the range of 90% to 100%
- A B-, B, or B+ is in the range of 80% to 89%
- A C-,C, or C+ is in the range of 70% to 79%
- A D-, D, or D+ is in the range of 60% to 69%
- An F is a grade of 59% or lower.
  Note that grades with pluses are in the highest end of the range, and minuses are in the lowest end of the range.

Questions regarding grades should never be directed at TAs, but instead always directed to the course instructors.

"Diligent Student" Drop Bonus

After having completed all work in the course, students who satisfy all of the following conditions will have their lowest exam score or quiz score 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 have been submitted 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.

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.

Attendance Expectations

Class time is considered to be vital to success in this course. Attendance is expected at every class session. Your health and safety matter greatly to us. If you are ill, we ask that you work with us to attend class remotely rather than in-person to the extent that it is both possible and reasonable.. 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 unexcused absence beyond the second. **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-19 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 instead, and plan to attend remotely if your symptoms are mild and you are unconcerned. If your symptoms are concerning to you, seek medical attention immediately, and email your instructors after your checkup--such absences will be excused 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. Respecting our peers is also important. Unfortunately, we all have biases, and those biases are not always conscious acts. An interesting study to test your own unconscious biases is available online from Harvard[3]. 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 us a note about it. We 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 Danforth Technology 104. The lab is open during the times listed at the top of the syllabus.Students are strongly encouraged to make use of the help available in the Computing and Digital Crafts 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. No question to which you do not know the answer is "dumb," unless it goes unasked.

Learning Accommodations

Berea College values diversity and inclusion and seeks to create a climate of mutual respect and full participation. Our goal is to create learning environments that are accessible, equitable, and inclusive for all students. If you encounter barriers based on the impact of a disability or health condition, please let Disability & Accessibility Services, Lisa Ladanyi (DAS, 111 Lincoln Hall, 859-985-3237, lisa.ladanyi@berea.edu) know immediately so that they can determine if there is a design adjustment that can be made to the course or if accommodations might be needed to overcome the barriers.

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 faculty members, one of our responsibilities is to help create a safe learning environment on our campus. We also have a mandatory reporting responsibility related to our role as a faculty member. While we will seek to keep information you share private to the greatest extent possible, We are required to share information regarding sexual

[3] https://implicit.harvard.edu/implicit/takeatest.html

misconduct with the college. Students may speak to someone confidentially by contacting Campus Christian Center [859.985.3134] or Counseling Services [859.985.3212] or visit www.berea.edu/titleix/ for more information.

Because current models predict the delta-variant surge of COVID-19 to peak in October and that vaccinated people have substantial but not complete protection, it is possible that a student may contract COVID-19 during this term and will need to quarantine. Vaccinated people tend to experience only mild symptoms in the rare case that they contract COVID-19, so we will work with students to make reasonable accommodations to help sick students to attend class remotely and to complete assignments remotely during their quarantine. If a quarantined student has severe symptoms and/or limited capability to remain engaged with the course, the best option may be for them to withdraw. Please consult with us and your academic advisor immediately should you be quarantined.

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 Joslyn_Glover@berea.edu or 859.985.3606.