

CS110Z Introduction to Computing and Cyber Operations in Python

Course Handbook Fall 2019

A. Course Description

Welcome to Computer Science 110Z! CS110Z is the Academy's introductory course to computing and cyber security. It does not require any prior computing or security knowledge.

B. Course Organization

Our primary goal is to develop your understanding of computer capabilities so that you can apply information technology to the complex problems you will encounter in the Air Force. With this goal in mind, the course has been designed to cover three broad areas of study:

- Algorithmic Reasoning
- Computer System Capabilities
- Cyber Operations

C. Course Objectives and Outcomes

By the end of this course, you will:

1. Apply structured algorithmic reasoning and engineering-based methods to solve problems.
2. Understand how computers operate and the capabilities that computer systems provide, including how data is stored, processed, and transmitted over networks.
3. Understand the basic concepts of offensive and defensive cyber operations, with a specific focus on cyber security and ethics.

CS110Z contributes to the following USAFA Outcome:

The development and assessment of the Application of Engineering Methods.

D. Course Texts

Required:

1. Introduction to Computing and Cyber Operations in Python (free interactive textbook refer to email with access code and signup instructions)
2. CS110Z: Homework and Assessments (free interactive textbook refer to email with access code and signup instructions)
3. Introduction to Computing and Cyber Operations (Digital Copy Provided by Department)

E. Course Administration

Lesson Objectives. Each lesson has explicit lesson objectives which define what you need to accomplish for that lesson as well as what you will be required to demonstrate for graded reviews and other assessments.

Reading / Video Assignments. You will accomplish the assigned readings, prework and videos for each lesson *before* you come to class. In fact, you will need to do these activities *before* you take the lesson's associated web-based quiz. During class, you will reinforce your learning with in-class activities and discussions that go beyond the material you read. If you come to class unprepared, you will probably have trouble keeping up during class.

Class Meetings. Class meetings are mandatory formations. The Dean has strict policies regarding attendance and tardiness which we strictly enforce. Furthermore, we expect you to demonstrate pride in yourself, your class, the Academy, and the Air Force by wearing the uniform properly and behaving in a professional manner. This includes being prepared for class, participating during class, and treating your instructor and fellow cadets respectfully.

Computer. Unless instructed otherwise, your computer is required for every lesson, properly configured, and with sufficient battery power for the duration of the class. While in class, you will not use your computer for other than class activities. These are a distraction to yourself, other students, and your instructor.

Absences. Except for circumstances beyond your control (e.g. emergency leave, hospitalization), you are responsible for coordinating with your instructor *in advance* if you will miss class. Examinations and assessments (GRs/PAs), to include the final exam, missed due to an unexcused absence will receive a mandatory academic penalty of 25% of the available points. (e.g. if a GR is worth 100 points, the academic penalty is a 25-point deduction from the GR grade earned). Cadets arriving later than 15 minutes into an examination or one hour into a final exam period will be considered absent. A makeup examination will be scheduled for the cadet, normally within one lesson of the regularly scheduled examination.

Late Policy. Late assignments will receive zero points unless coordinated *in advance* with your instructor.

Extra Instruction (EI). The willingness and availability of your instructors for extra instruction (EI) puts the Air Force Academy in an elite class. Whenever you have a question about the material, or if you need advice in other areas, *your instructor wants to meet with you*. However, there are some things you can do to make the most of both your time:

- Write out your questions, annotate your readings, and make notes about unclear concepts. Bring specific questions, not vague comments such as "I'm lost."
- Let your instructor know if an explanation is not making sense to you. They can then try alternative explanations until you understand the material.
- If you are unsure if you understand something clearly, try to explain the concept to your instructor and see if your instructor agrees with your explanation.
- Take notes of concepts as they become clear.

- Make sure all your questions are resolved during the EI session.
- If you're receiving help with a computer-based application, bring your computer so your instructor can see what you have attempted.

Find out how your instructor wants EI scheduled. Some instructors will want you to schedule appointments face to face, others via email, and others via Outlook (instructions provided below). Schedule EI according to your instructor's preferred method.

Scheduling Appointments using Outlook.

1. In Microsoft Outlook, click the "New Items" icon on the main menu and select "Meeting"
2. Type "CS110Z EI: " followed by your name and section number in parentheses in the subject field. e.g. "CS110Z EI: C4C Barrett (M1B)"
3. Add any helpful information in the body of the appointment (useful, but not required)
4. Select the "Scheduling Assistant" icon
5. Type in your instructor's name where it says "Click here to add name"
6. Compare your schedules – blue and purple bars indicate times that are unavailable.
7. Scroll to the date desired and click on the time slot you want for the appointment. EI should typically be scheduled for 30 minutes unless coordinated with your instructor.
8. Go back to the appointment details by clicking the "Appointment" icon, confirm the date and time are correct, and make sure the Reminder alarm is set to 15 minutes.
9. Click the Send button.

The appointment will automatically go on your Outlook calendar. Once your instructor reads and accepts your request, it will also be added to their calendar. If they have a conflict not on their calendar, they'll get back to you with an alternative meeting time.

F. Graded Events.

Graded work will consist of web-based quizzes, prework / labs (zyBooks activities), two (2) in-class PYTHON assessments (PAs), two (2) in-class graded reviews (GRs), a project, and a final exam. Grade lines for the course are set as follows:

A at 92%, A- at 90%, B+ at 88%, B at 82%, B- at 80%,
C+ at 78%, C at 72%, C- at 70%, D at 60%

Graded Event	Number of Events (Prog)	Points (Prog)	Number of Events (Post-Prog)	Points (Post-Prog)	Total Points
Quizzes	0	0	10	50	100
Prework / Labs	14	70	0	70	70
Homework	0	0	1	5	5
Assessment	2	200	0	0	200
Graded Reviews	0	0	2	250	250
Project	2	50	4	125	175
Final Exam	0	0	1	250	250
Total	18	320	18	680	1000

Web-based Quizzes. Most non-zyBooks course reading assignments have an associated web-based quiz.

- You must complete quizzes by TAPS (2300) the night **before** the lesson for which the associated reading is assigned.
- You may refer to the reading during the quiz.
- The questions on the quizzes test your knowledge and comprehension of the material in the assigned reading and video(s). You will not do well on the quiz (or fully understand the material presented in class) if you have not completed the assigned reading and/or watched the video(s).
- You will not be able to complete the quiz if you attempt to start it after the deadline. If computer or network problems prevent you from taking a quiz, you should notify your instructor immediately.
- There are approximately thirty (15) quizzes available throughout the semester, but **only the highest ten (10)** will be recorded for a grade. This will give you some flexibility in managing your time and energy.

Homework Assignments.

- There is one homework assignment. This assignments are graded and serve as preparation for graded events.
- The assignment is designed to get you to think about your problem solving approach and to practice implementing your solutions by reinforcing concepts covered in class.
- The homework assignment will be due NLT the start of your class period on the day they are due as assigned by your Instructor. Specific submission instructions will also be provided by your Instructor.

PYTHON Assessments (PAs). We will be using a text-based programming language, called PYTHON, suited to the needs of those new to programming and algorithmic thinking. There will be two in-class assessments.

- The in-class assessments are individual effort – no help is allowed from your instructor, other cadets, or other materials.
- The questions on the in-class assessments will be similar to prior homework and classroom assignments.
- Make-ups will be provided for cadets who have “higher priority duties” on the day of the assessment. The altitude chamber and VECTOR are **not** higher priority duties than in-class assessments or graded reviews and must be rescheduled as appropriate.
- If you miss an assessment for any other reason, you will receive a zero. If you are late (unexcused), then you will only have the remaining time and will cease work with the rest of the class.

Graded Reviews (GRs). There will be two (2) graded reviews. Questions may be either multiple choice or short answer.

- The graded reviews assess your knowledge, comprehension, and ability to apply the material covered in the previous block. Questions will be based on the documented lesson objectives.
- Make-ups will be provided for cadets who have “higher priority duties” on the day of the graded review. As with the programming assessment, graded reviews take precedence over the altitude chamber and VECTOR, which must be rescheduled appropriately.
- If you miss the graded review for any other reason, you will receive a zero. If you are late (unexcused), then you will only have the remaining time and will cease work with the rest of the class.

Project. There is a significant programming project in this course. This project will give you the opportunity to hone your problem solving skills on a significant programming challenge.

- This project will be accomplished in teams of two persons.
- There will be six (6) turn-ins associated with this project – five (5) gate checks and a final submission. Additional details will be provided when the project is assigned.

Final Exam. The final exam covers all lessons in the course and it is weighted relatively evenly over all lessons. The final exam counts for 25% of your grade and can “make or break” your final semester grade.

- The top 5% of the cadets in the course, excluding those in the Honors sections, will earn an 'A' without having to take the final exam. The points used for validation will include all the graded work completed prior to the end of Lesson 40.
- The Registrar determines the time and place for final exams. Your instructor cannot reschedule your final exam. You should not make any travel plans until you received your final exam schedule from the Registrar towards the end of the semester.

G. Keys to success.

"The only thing I really did was copy and paste all of the objectives then go back through the text and copy paste the answers so studying wasn't as overwhelming. I went back though Homework 4 as well. Also, the PYTHON refresher problems were really helpful! I actually went back and re-worked those the day of...to make sure I knew what I was doing." ~ Highest scoring cadet (98.6%) on the Fall 2016 CS110Z final exam

- **Prepare for class.** Come to class having completed the course readings and videos, being aware of future assignments, and ready with questions to fill in gaps in your understanding. If arrive prepared, knowing the course objectives and whether or not you are able to meet the course objectives based on the reading, you will be a more active participant in class.
- **Read actively.** Before reading, make a note of the lesson objectives. The lesson objectives are things you are expected to be able to do following the lesson. Both the course text and the in-class lesson are intended to equip you to meet the lesson's objectives. While reading, work out the problems and answer the questions provided in the text. If you are not sure how the text solved a problem or completed an algorithm (program), add it to your question list for the next class. After reading, review any upcoming assignments and determine whether you can complete the assignment based on your reading. If not, come to class prepared with questions.
- **Get help early.** Being behind doesn't get better with time. If you are unclear on an objective after completing the reading and participating in the corresponding lesson, schedule help that day. Don't assume you will pick it up later – more than likely, we're moving on to another topic, leaving you further behind.
- **Do something every lesson.** This course is designed with an expectation that you spend 2 hours preparing for every hour in class. Not every lesson will require 2 hours of preparation, but discipline yourself to do something every lesson. Spending some time with material every lesson will save you time in the long run by helping you master the material.
- **Don't multitask**—neither in class nor when studying. We don't really multitask well and deceive ourselves thinking we are better than we really are. Studies show that every interruption results in a loss of 2-5 minutes as we come back to a task in order to collect our thoughts and remember where we are. Turn off your text messages and Facebook while studying. Just 6 interruptions an hour can result in a loss of 30 minutes – in addition to whatever time you spent texting and Facebooking! If necessary, find a quiet place away from people and distractions.
- **Plan ahead** and use a calendar—don't lose points by neglecting to turn in assignments!
- **Practice!** Some students have found PYTHON challenging. However, we have seen over the years that those students who spend adequate time practicing PYTHON problems do very well on the PYTHON assessments. Start early on PYTHON and practice a lot. The initial problems may seem easy, but problems will get more difficult as the course progresses. Emphasize your PYTHON practice to avoid getting behind.