

SI 206 Winter 2019 – Data-Oriented Programming

Instructor: Barbara Ericson (barbarer@umich.edu) (Office - NQ 4438)

GSIs: Matthew (Matt) Cloutier, Kathryn (Katie) Cunningham, and Sonal Doomra

IAs: Morgan Durow, Jacob Kirsch, Chalse Okorom, and Joleen Powers

The GSIs are an incredible resource. However, they are contractually limited to keep their contact hours under a certain amount, and this includes email contact.

Contact:

- 1) Your first point of contact should always be the Piazza message board through Canvas. This is a great place to get and receive help.
- 2) If you have not been able to find help there, the next step is to fill out the Help Queue Form using the Google Form: <https://goo.gl/forms/aBCi4CK9z2oPf0EI2>
- 3) For other course questions please use: 206-Instructors@umich.edu
- 4) For grade disputes please use the Google Form Regrade Request form via Google: <https://goo.gl/forms/NdAt642KqTuT0njh2>
- 5) For questions of a personal nature, please use my email (barbarer@umich.edu)
In all cases if you have not had a response within 2 business days, please try again.

Lectures: M/W 1:00pm to 2:30pm (starts at 1:00pm and ends at 2:20pm) 100 Hutchins

Discussion Sections: *You must attend the discussion section you are enrolled in!*

Section #	Date and Time	Location	GSI Leader and IA
2	Tuesday 2:30pm - 3:30pm	335 WH	Katie and Joleen
3	Wed 9am to 10am	2245 NQ	Matt and Morgan
4	Wed 4pm - 5pm	1265 NQ	Sonal and Chalse
5	Tues 5:30pm - 6:30pm	1175 NQ	Katie and McCoy
6	Wed 10am - 11:00am	1255 NQ	Sonal and Chalse
7	Thurs 4pm - 5:00pm	1255 NQ	Matt and Jacob

Office hours:

Office hours are a great time to ask questions about assignments. Students who are waiting should feel free to help each other out.

Barbara Ericson - Tuesdays from 2pm to 4pm in 1278 North Quad

Matthew (Matt) Cloutier - Tuesdays from 4.30 pm to 6.30 pm in NQ 1270 and Wednesdays from 12pm-1pm in NQ 1270

Kathryn (Katie) Cunningham - Wed 10-11am in NQ 1274 and Thurs 2-4pm in NQ 1274

Sonal Doomra - Tue 5.30-6.30 PM in NQ 1270 and Thursday 2-4 PM in NQ 1274

COURSE RESOURCES

- An iClicker. We will use these in lecture for peer instruction questions. Peer instruction has been shown to increase student engagement and learning.
- A laptop: if you do not have a laptop to use in class (whether because you have a desktop computer OR because you use University computers for your coursework), that is fine –but please let Barb know by the end of the first week of class so we can make sure you have participation options.
- Readings: we are using several free ebooks
 - We will refer to Python for Everybody: Exploring Data in Python3, which can be found here: <https://www.py4e.com/lessons>
 - We will refer to excerpts from CS Principles: Big Ideas In Programming, which can be found here: <https://tinyurl.com/SI206-Winter2019> You will need to register the first time you go to that URL. Use your UMich unique name (part of your email) as your username.
 - We may refer to excerpts from Programs, Information, and People (Python 3) <https://www.programsinformationpeople.org/runestone/static/publicpy3/>
- We will also read and refer to a number of other free online sources, all of which will be provided to you via Canvas and links. *You can find the weekly reading assignments in the Modules section of Canvas.*

COURSE DESCRIPTION

This course will focus on giving you a strong background in data-oriented programming, in the Python programming language. It is intended for students *who have completed an introductory programming course* and are moving on to the next step in a data-oriented fashion.

- Learn how to use a terminal window to run a Python program locally on your computer
- Develop intermediate programming skills in Python
- Practice using basic data structures (lists, tuples, dictionaries)
- Increase your understanding of object-oriented programming: objects, classes, and inheritance
- Develop debugging and testing skills
- Develop experience using a distributed code repository (github).
- Develop experience with using pattern matching (regex)
- Work with data from a variety of sources (files, web, APIs, JSON, databases)
- Learn how to read and use APIs

Homeworks and projects are oriented around data manipulation: data is distributed online among many Web pages, stored in a database, or available in a large text file. Often these data (e.g. all headlines from a year of newspapers) are too large to obtain and/or process manually. Instead, we need an automated way to gather the data, parse it, and summarize it before we

can do more advanced analysis. The course teaches how to use Python and its packages to accomplish these tasks in a quick, useful, and repeatable way. Overall, we will be focused on gaining good understanding of code, such that you can pick up new frameworks and packages and learn to use them comfortably, comfort with manipulating and debugging and documenting code, and practice writing solid, modular, clearly understandable code.

The skills taught in this course are useful regardless of whether data analysis or processing or data science are immediately in your present or future. Indeed, they are useful across disciplines, from arts, to humanities, to lab sciences, to social and computing sciences and beyond.

The work in this course will consist primarily of:

- **Readings** which will be assigned before lectures and posted on Canvas. Lectures will assume those readings have been completed, and will address tricky ideas from them, questions that may come from them, and extensions from them. We will use freely available online textbooks, but we will also occasionally include other free online resources and links. Readings may occasionally include exercises. We ask that you put any questions about the readings on our Piazza site forums.
- **Homework assignments** are mostly programming assignments which will help you build up to the projects in the course and/or develop skills.
- **Projects.** There will be two regular projects and one final project in the course. The homework assignments preceding each project will usually build up to the project, but in each project you'll have some new additions before it is complete or an opportunity for personal creativity. Programming is a creative discipline, and we want you to embrace that! The final project will provide more options for creativity than the others, which you can use as a basis for ideas.
- **Other graded components.** There will be two **midterm exams**, and **discussion attendance** is required. See below for the grading scheme details.
- Lectures will include **student participation**: question-asking, peer instruction, going around the room for participation, occasional paired activities, etc. We strongly encourage you to ask questions when you are uncertain of an answer, because that is helpful for everyone! **Please do answer questions in lecture as well and don't be afraid of getting an answer wrong - we don't grade lecture answers.**

GRADED ASSIGNMENTS IN THIS COURSE

Homeworks (480 pts) - Worth 60 points each

We drop the two lowest homeworks. No homework is accepted more than 24

hours late. (Be warned though, you will want to complete the homeworks in order to work on the Projects, especially the last couple of homeworks.) Homeworks will vary: some will involve completing some programming problems, or trying out someone else's code, or debugging... it will vary dependent upon the topic(s) we are focusing on that week. If you enroll late for the course you have 48 hours from enrollment to complete any missing homeworks.

Regular Projects (not including the final project) (600 pts - 300 points each)

You must complete the two regular projects. You have up to 8 late days (total) over the course of the semester in which we will not deduct points on the regular projects. There is no need to explain the circumstances. These late days are automatically applied the first time you don't turn in a project on time. **The final project can not be late.**

Git commits (120 pts)

After learning about Git version control, you are required to make at least 3 commits on homeworks per week. Each commit is worth 5 points, up to 3/week for a maximum of 15 points per week. We will drop the lowest two of these (count the highest 8).

Midterm Exams (300 pts - 150 each)

The midterms are in lecture on Monday February 11th and Monday March 18th. **Do not schedule any trips for these dates.** If you have a conflict, notify Barb as soon as possible.

Lecture Participation (100 pts)

Your lecture participation is based on answering iClicker questions and/or surveys or turning in programming challenges. You must answer $\frac{3}{4}$ of the peer instruction questions in a lecture to receive credit. We will have index cards in lecture in case your iClicker isn't working or you forgot it, but you can only turn in 4 index cards over the semester. Each lecture is worth 5 points. You can also earn 5 participation points by answering a question when your name is pulled at random. We will count the highest 20 lecture participation points.

Final project (300 pts)

Your final project will build on some of the work you've done earlier in the semester. It will be approximately the size/difficulty of two regular projects. No late submissions are accepted. You can work on a team of two or three people for this project.

Discussion Attendance (100 pts)

There are 13 discussion sessions. We will give you 10 points for each discussion session you attend up to a total of 100 points.

- You are absent if you arrive more than 10 minutes late.
- You may not attend an alternate discussion.
- Your free misses count for missing discussion due to job interviews, fairs, celebrations, travel, late enrollment, etc. There are no excused absences other than this, other than in extraordinary circumstances

Regarding extensions:

Homeworks may be handed in up to 12 hours late with no penalty and up to 24 hours late with a 10% penalty. After that, no late submissions are accepted. For Projects you have a total of 8 days you can apply during the course of the semester. There is no need to request or explain these late days. However, you do not get to choose which projects to apply them to - they are applied at the first instance. **There are no extensions for the Final Project.**

However, if you have an extreme medical or family care or other type of situation that may be an extraordinary circumstance, please contact Barb to discuss an extension. You need to contact Barb **at least three days in advance** for an extension on a homework or project. Homeworks build up to the projects, and you should not be first reading or starting projects less than 3 days before the deadline.

Regarding grading and re-grading:

We grade all assignments with a strict rubric, wherein the same rubric is applied to everyone. If you believe there is an error in the way you have been graded, please submit a regrade request per our system. We will change your grade if there has been a mistake; we will always apply the same rubric to every person's assignments. **All regrade requests must be submitted within 7 days of assignments being graded.**

GRADING IN THIS COURSE

There is a total of approx. 2000 points available in this course (see above for how they are distributed among different types of assignments). The approximate grading boundaries are as shown:

2000 - A+	1400 - C
1800 - A	1370 - C-
1775 - A-	1340 - D+
1750 - B+	1200 D
1600 - B	1175 D-
1570 - B-	
1540 - C+	

If there are a different number of points e.g. on the midterm or final project, we will retain the percentage correspondences to grades, but the point totals required for each will change. ***This class is not curved.***

Throughout the course, in lecture, discussion sections, and office hours, we expect respect of one another – this class is yours as much as it is ours, and a positive environment in this class is up to you. To that point, if you choose to use a computer during lecture, you should use it solely for course material and note-taking, so as not to distract others.

We expect you to read all assignment instructions carefully and thoroughly: instructions can make all the difference. Being overwhelmed and confused is always acceptable (and often expected) in this course, but you must ask questions early and often.

Student Mental Health and Well-being

The University of Michigan is committed to advancing the mental health and wellbeing of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. For help, contact Counseling and Psychological Services (CAPS) at (734) 764-8312 and <https://caps.umich.edu/> during and after hours, on weekends and holidays, or through its counselors physically located in schools on both North and Central Campus. You may also consult University Health Service (UHS) at (734) 764-8320 and <https://www.uhs.umich.edu/mentalhealthsvcs>, or for alcohol or drug concerns, see www.uhs.umich.edu/aodresources. For a listing of other mental health resources available on and off campus, visit: <http://umich.edu/~mhealth/>

Accommodations for students with disabilities

If you need an accommodation for a disability, please let me know by the end of the 2nd week of class or within 72 hours of new documentation. Some aspects of this course, the assignments, the in-class activities, and the way we teach may be modified to facilitate your participation and progress. As soon as you make me aware of your needs, we can work with the Office of Services for Students with Disabilities (SSD) to help us determine appropriate accommodations. SSD (734-763-3000; ssd.umich.edu/) typically recommends accommodations through a Verified Individualized Services and Accommodations (VISA) form. I will treat any information that you provide in as confidential a manner as possible.

Academic Integrity:

UMSI strongly encourages collaboration while working on some assignments, such as homework problems and interpreting reading assignments as a general practice. Active learning is effective. Collaboration with other students in the course will be especially valuable in summarizing the reading materials and picking out the key concepts. ***You must, however, write your homework submission on your own, in your own words, before turning it in.*** If you worked with someone on the homework before writing it, you must list any and all collaborators on your written submission, and what you worked together on. Read the instructions carefully and request clarification about collaboration when in doubt. **Collaboration is always forbidden for take-home and in class quizzes and exams.** Largely duplicate copies of the same assignment will receive a 0 for all parties. See the (Doctoral, MSI, BSI) student handbooks available on the UMSI intranet for the definition of plagiarism, resources to help you avoid it, and the consequences for intentional or unintentional plagiarism.

If you are a more advanced student and are willing to help other students, please feel free to do so. Just remember that your goal is to help teach the material to the student receiving the help. It is always appropriate to ask for and provide help on assignments via the forums or during the open lab portions of class. **Any instances of cheating will result in a 0 for the assignment and the lowering of the final grade by one grade level.**

Answers to FAQ

- Posting code snippets on Piazza is great, and encouraged! Posting complete answers to homework problems or programs is not acceptable.
- Study groups are welcome and strongly encouraged, as is talking through any and all programming problems you encounter. However, if you feel you are either giving or receiving all of the answers and it is impacting your learning negatively, please break up your study group, and/or contact Barb confidentially.
- Use of any solutions provided from previous semesters is not allowed.