SI 206 Winter 2020 – Data-Oriented Programming

Instructor: Barbara Ericson (barbarer@umich.edu) (Office - NQ 4438)
GSIs: Matthew Whitehead (Matt), Maulishree (Mauli) Pandey, Abraham Mhaidli
IAs: Joleen Powers, Abigail Snyder, Usha Yeruva, AJ Carter, Julia Lauer, Casey Tin

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://forms.gle/rP4Exp1gEN7AWjfc6
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://forms.gle/83jPzT37JyyCeuVX9
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 1pm to 2:20pm in the G378 Dent (School of Dentistry). 1011 N University Ave, Ann Arbor, MI 48109.

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

<table>
<thead>
<tr>
<th>Section #</th>
<th>Date and Time</th>
<th>Location</th>
<th>GSI Leader and IA</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Tues 3pm - 4pm</td>
<td>3242 LSA Online Link:</td>
<td>Mauli and Abigail</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="https://us04web.zoon">https://us04web.zoon</a></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>m.us/j/630730406</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Wed 9am - 10am</td>
<td>2185 NQ Online Link:</td>
<td>Mauli and Usha</td>
</tr>
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<td><a href="https://us04web.zoon">https://us04web.zoon</a></td>
<td></td>
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<td></td>
<td></td>
<td>m.us/j/595851202</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Wed 4pm - 5pm</td>
<td>2353 MH Sign up to office</td>
<td>Abraham and Joleen</td>
</tr>
<tr>
<td></td>
<td></td>
<td>hours at this link.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>The office hours video call is at this link.</td>
<td></td>
</tr>
</tbody>
</table>
Making up Discussion Section: Given the recent disruption caused by COVID-19 and remote discussion section, we acknowledge that some folks might find it difficult to make the discussion section in person (e.g., different time zones). In those cases, if the student still wants to make up their discussion section, they should follow these steps:

1. Go through slides of discussion section (which we will upload to Canvas).
2. Go through the tasks in the discussion section. Spend ~50 minutes on these tasks.
3. Fill out this form. In it you will be asked to provide 2--3 sentences of something you learned / took away from doing the task, with the goal of proving you engaged with the material. [https://forms.gle/dsstNPxNS4VGfVtx6](https://forms.gle/dsstNPxNS4VGfVtx6)

Students who complete this will receive attendance credit.

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. You are encouraged to bring your computer and work in the office hour room, that way you can ask questions if you have any.

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Location</th>
<th>Instructor and GSIs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>3.00pm - 4.30pm</td>
<td>online</td>
<td>Abraham and Usha&lt;br&gt;Sign up for slots for one-on-one videocall with Abraham at: <a href="https://forms.gle/dsstNPxNS4VGfVtx6">this link</a></td>
</tr>
</tbody>
</table>
Once you are signed up, click on the link on the google calendar to the Zoom meeting (link again here: [here](#)).

If you have small questions that do not necessitate one-on-one call, click on the zoom link above. In the call, there will be a breakout room with Usha to help answer these small questions.

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Type</th>
<th>Members</th>
<th>Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuesday</td>
<td>3:30pm - 6:30pm, 5pm - 6:30pm</td>
<td>online</td>
<td>Matt, Casey (5:00-6:30), AJ (4:00-5:00), Mauli &amp; Julia (5:00 to 6:30)</td>
<td><a href="#">here</a> <a href="https://umich.zoom.us/j/283463907">https://umich.zoom.us/j/283463907</a></td>
</tr>
<tr>
<td>Wednesday</td>
<td>9.30am - 11am, 3:30pm - 5pm</td>
<td>online</td>
<td>Abraham and Usha (10:00-11:00), Mauli and Abby (3:30 - 5 PM)</td>
<td><a href="#">here</a> <a href="https://umich.zoom.us/j/283463907">https://umich.zoom.us/j/283463907</a></td>
</tr>
<tr>
<td>Thursday</td>
<td>1pm - 3pm</td>
<td>online</td>
<td>Barbara Ericson and Joleen</td>
<td><a href="https://zoom.us/j/514793892">https://zoom.us/j/514793892</a></td>
</tr>
</tbody>
</table>

**COURSE RESOURCES**

- **We will use peer instruction with either an iClicker remote or a paid iClicker Reef subscription.** which lets you use a phone, tablet, or laptop. See [https://tinyurl.com/iClicker-setup](https://tinyurl.com/iClicker-setup) for what to do. You can use an iClicker remote if you have one, or use a phone, tablet, or laptop with a paid Reef subscription account after the two week trial period. **Note: registering your iClicker on Canvas does not register it on iClicker Reef! You must register the iClicker on iClicker Reef and add this course (SI 206 - Winter 2020) on iClicker Reef to get credit.**

- 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-Win20. You will need to register the first time you go to that URL. Use the first part of your email (before the @) as your username. If you already have an account on Runestone click on the person icon on the top left of your screen in Runestone and then click on "Change Course" and then on "Enroll in a Course" at the bottom of that page. Type in SI206-Win20 for the course name.
  ○ We may refer to excerpts from Foundations of Python Programming. See https://runestone.academy/runestone/books/published/fopp/index.html
• 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 work with relational databases via SQL

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 this data (e.g. all headlines from a year of newspapers) is 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 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. A project is about twice the work of a homework. 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, occasional paired activities, solving problems, 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. You learn the most when you make mistakes and get feedback.

**GRADED ASSIGNMENTS IN THIS COURSE**

**Homeworks**  (420 pts) - Worth 60 points each
We keep the top 6 homework grades (drop two lowest) and average the grades from the 6 that were kept to create a 7th to reach 420 points. No homework is accepted more than 24 hours late. (Be warned though, you will want to complete the homework in order to work on the Projects, especially the last couple of homework assignments.) If you enroll late for the course you have 48 hours from enrollment to complete any missing homework. Working with another person on homework is okay, but don’t just copy someone else’s work. You must list who you worked with on your homework in your code. If we find that your code is identical to another person's and you didn't list that person as someone you worked with
then you may receive a 0 on that work.

Regular Projects (not including the final project) (400 pts - 200 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.** Working with another person on a project is okay, but don't just copy someone else's work. Each person must contribute an equal amount of code! You must list who you worked with on your project in your code. If we find that your code is identical to another person's and you didn't list that person as someone you worked with then you both will receive a 0 on that work.

Git commits (120 pts)
After learning about Git version control, you are required to make at least 3 commits on homeworks and projects per week. Each commit is worth 5 points, up to 3/week for a maximum of 15 points per week. We will count the highest 8 of these.

Midterm Exams (460 pts - 230 each)
The midterms are in lecture. **Do not schedule any trips for these dates.** If you have a conflict, notify the instructional team as soon as possible.
Lecture Participation (max 200 pts)
Your lecture participation is based on answering iClicker questions and/or surveys or exercises. You must answer ¾ of the peer instruction votes during lecture to receive 5 points of credit for that lecture. 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. We will also have lecture challenges that you can complete for 5 points usually. You can earn a maximum of 200 points for lecture participation. There will probably be 22 lectures in which you can earn points for using an iClicker (we don’t make you use them the first lecture). Even if you miss lecture, you can do the lecture challenge.

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 will 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:

<table>
<thead>
<tr>
<th>Points</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>A+</td>
</tr>
<tr>
<td>1800</td>
<td>A (90%)</td>
</tr>
<tr>
<td>1775</td>
<td>A- (88.75%)</td>
</tr>
<tr>
<td>1740</td>
<td>B+ (87%)</td>
</tr>
<tr>
<td>1600</td>
<td>B (80%)</td>
</tr>
<tr>
<td>1575</td>
<td>B- (78.75%)</td>
</tr>
<tr>
<td>1540</td>
<td>C+ (77%)</td>
</tr>
<tr>
<td>1400</td>
<td>C (70%)</td>
</tr>
<tr>
<td>1375</td>
<td>C- (68.75%)</td>
</tr>
<tr>
<td>1340</td>
<td>D+ (67%)</td>
</tr>
<tr>
<td>1200</td>
<td>D (60%)</td>
</tr>
<tr>
<td>1175</td>
<td>D- (58.75%)</td>
</tr>
</tbody>
</table>

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. If you worked with someone on a homework or project, you must list them on your written submission. 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. 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.
• Working with another person on homeworks and projects is okay, but don't just copy someone else's work. You must list who you worked with on your homeworks and projects. If we find that your code is identical to another person's and you didn't list that person as someone you worked with then you will receive a 0 on that work.