Welcome to ISTA 350 – Programming for Informatics Applications!

Introduction. ISTA 350 is an intensive third course in the art of programming using Python. Coding is fun and useful, and Python is a particularly fun language. The ability to program, even at a rudimentary level, is an important advantage in the job market, no matter the field. More importantly, the approach to problem-solving that learning to program engenders is a transferrable skill. Because skills are only learned by practice, this class uses a flipped format – I lecture for a while, then you practice.

Competencies. This class addresses the following ISTA BS competencies (see the table at the end of this document for an explanation of each): F1.1, F1.2, F1.3, DAISBS2.2, DAISBS2.3.

Prerequisites. ISTA 116 & 131.

Location/Time.

Days	Time	Location
T, Th	12:30 – 1:45 pm	ILC 130

Instructor.

Name: Rich Thompson
Office: Harvill 442
E-mail that goes to me and all SL's: ista350-questions@list.arizona.edu
E-mail just to me: rmthomps@email.arizona.edu

Office Hours. Whenever the door is open, by appt., and (likely to change when SL OH known):

Days	Time	Location
W, Th	10:00 – 11:50 am	Harvill 442

Section leader office hours will be posted in a separate document. I do not require section leaders holding office hours at night to remain in the office and online if no one is showing up. If you want late office hour help, it is a good idea to let the relevant section leader know in advance.

Discussion Sections.

Section	Days	Time	Location	Section Leader
001B	M	9:00 – 10:50 am	ECE 228	Gwen Hopper
001C	M	11:00 am – 12:50 pm	Engr 318	Jake Heller
001D	M	1:00 pm – 2:50 pm	ECE 228	Hannah Smith

Each discussion section is led by an undergraduate section leader (SL). Section leaders rock! They are expert Python programmers and totally committed to their teaching duties. Weekly discussion sections will give you the opportunity to work on timely programming examples, ask questions about recent lecture topics you don't fully understand, and will allow us to offer clarifications on programming exercises, among other activities.

Each of the SLs has successfully completed ISTA 350 and is compensated by the School with credits and/or dollars to help you learn the material. In addition to leading a section each week, they grade assignments and quizzes, assist in grading the exams, inform the instructor on what topics seem to be especially baffling to the students, write quizzes and assignments, and hold office hours. We expect that you'll find your section leader to be a valuable resource.

We will be using Python 3.7.x as the programming language for this class. This version of Python (available for Windows, Mac OS, and Linux from python.org) has been installed in the following labs:

- OSCR Labs:

  Mac & Windows
  - Campus Rec, ENG 318, McClelland Park 102, Nugent 15b, Shantz 338, SUMC Lab, and the Park Student Center lab. More info here: http://uits.arizona.edu/departments/oscr/locations/hours.

  Windows only
  - ECE 229

Map of OSCR Lab Locations:
- http://oscr.arizona.edu/node/4

OSCR Lab Hours:
- http://uits.arizona.edu/departments/oscr/locations/hours

OSCR Lab Policies:
- http://uits.arizona.edu/departments/oscr/locations/policies

You will also be able to complete your assignments using your own desktop or laptop computers. All of the software we use in this class is freely and legally available for you to download and install.

Section Leaders.

001B Gwen Hopper: gfhopper@email.arizona.edu
001C Jacob Heller: jacobheller@email.arizona.edu
001D Hannah Smith: hannahksmith@email.arizona.edu

Or send your question to all of us: ista350-questions@list.arizona.edu
I do not require section leaders who are holding evening office hours to stay for the whole time if no one is showing up/discussing online. If you are planning on arriving late to evening office hours, it is advisable to make prior arrangements.

Textbooks. The following text, available free online to UA students, is an outstanding book. It is applicable to the `numpy`/`pandas` part of the course. And it has a great review of basic Python.

> McKinney, Wes. (2017). *Python for Data Analysis, 2nd Edition*. O'Reilly Media, Inc. http://proquest.safaribooksonline.com.ezproxy1.library.arizona.edu/book/programming/python/9781491957653

The following text, available free online to UA students, is also an outstanding book. It is applicable to the web scraping part of the course. It also starts with an overview of Python basics. If you use this book, do not use IDLE! `IDLE == bad`

> Sweigart, Al. (2015). *Automate the Boring Stuff with Python: Practical Programming for Total Beginners*. No Starch Press. http://proquest.safaribooksonline.com.ezproxy1.library.arizona.edu/9781457189906?uicode=uariz

This free book is pretty good for some of the basics, including recursion and trees (which we may or may not do):

> http://interactivepython.org/runestone/static/python/index.html

And, of course, there is the text that we used in 130:

> http://interactivepython.org/runestone/static/thinkcspy/index.html

Grading. Grades will be based on discussion sections, quizzes, programming assignments, a midterm, and a comprehensive final as follows:

Breakdown	
Discussion Sections	10%
Programming Assignments	30%
Quizzes/Worksheets	10%
Midterm	20%
Comprehensive Final	30%

Scale	
A	[90, 100]
B	[80, 90)
C	[70, 80)
D	[60, 70)
E	[0, 60)

- Programming assignments are the heart of this class, although they are only 30% of the grade. The learning happens through these assignments and in-class exercises; evaluation happens on the tests. Programming is one of those things that can only be learned by doing. **We grade your latest submissions.**
- Your lowest discussion section score and two lowest quiz/worksheet scores will be dropped. Any quizzes will be in-class and unannounced.
- If you are more than 15 minutes late for discussion section, you will receive no points for that day.
- Programming assignments will typically be due at 11:59 pm on Thursdays. Programs can be turned in up to 11:59 pm on Friday for a 10 point reduction in grade. After that, a grade of zero will be awarded. **No work will be accepted after the last lecture without prior arrangement.**
- If you miss the midterm, your final will be worth 50% of your grade.
- The final will be on the scheduled day at the scheduled time, so plan to be here.
- Requests for the grade of Incomplete **MUST** be made prior to the final. All but the last two assignments must have been completed with a passing average. See the **Grading Policy** section below for the relevant UA link.
- Expect the grading scale not to change. If you do all of the work in disciplined fashion, then it is really easy to get a good grade in this class. It might (but probably won't) get easier. It won't get harder.

Cheating. Collaboration is allowed on programming assignments. It is up to you to make mature decisions about your learning process. If you depend too much on others while doing your assignments, you will get killed on the tests. If you are the party providing help, you are assuming the role of teacher, with its attendant responsibilities. If you do not take them seriously, you aren't helping your friend, you are hurting him/her. You may do this in response to social pressure, to feed your ego, or just out of inexperience, but this is no good for anybody.

If you work with others or get code from others, you need to state this in your program documentation. Representing the work of others as your own is both lying and cheating. **If you**

are caught engaging in this behavior, an academic dishonesty complaint will be filed against you with the Dean's office. The party providing the code is also guilty – if you aren't certain your friend will acknowledge your code in his/her documentation, don't provide it. These sorts of behaviors can become habitual and lead to seriously negative consequences in life.

When using the code of others, there is a point after which we won't consider the work to be yours and you won't get credit for it (although it's not cheating if you are honest about it). We determine where this point lies on a case-by-case basis.

Tests are solo efforts! If I catch you cheating, I will prosecute to the full extent allowed by University policy: http://deanofstudents.arizona.edu/policies-and-codes/code-academic-integrity. I reserve the right to move students into seats of my choosing.

Class Schedule. Exams will occur as scheduled, but the topic schedule may change.

Day	Date	Topic	Due
Th	Jan 16	1: Introductions Review	
M	Jan 20	MLK Day: NO DISCUSSION SECTIONS	
T	Jan 21	2: Regular expressions, search	
Th	Jan 23	3: Memory diagrams	
T	Jan 28	4: Review classes, trees Last day to drop without a W	
Th	Jan 30	5: Built-in data structures	Hw1: Regular Expressions, Search
T	Feb 4	6: Hw1	
Th	Feb 6	7: Big O	Hw2: Parse Trees
T	Feb 11	8: Big O	
Th	Feb 13	9: Decorators, operator overloading, SQL	Hw3: Classes and Databases
T	Feb 18	10: Two's complement binary numbers	
Th	Feb 20	11: Two's complement binary numbers	Hw4: Magic Methods, 2's Comp
T	Feb 25	12: Recursion	
Th	Feb 27	13: Binary search trees (BST's)	Hw5: Recursion and Sort
T	Mar 3	14: More big O, sort	
Th	Mar 5	15: TBA	Hw6: Web Scraping I
T	Mar 10	Spring Break: NO CLASS	
Th	Mar 12	Spring Break: NO CLASS	
T	Mar 17	16: Review	
Th	Mar 19	17: Midterm	
T	Mar 24	18: Stats review, normal distribution	
Th	Mar 26	19: Stats	Hw7: Web Scraping II
T	Mar 31	20: Web scraping Last day to withdraw w/o Dean consent	
Th	Apr 2	21: Extracting data from HTML	Hw8: Web Scraping III
T	Apr 7	22: Extracting data from HTML	

Th	Apr 9	23: Extracting data from HTML	Hw9: Web Scraping IV
T	Apr 14	24: Pandas review	
Th	Apr 16	25: API's, the stack ADT	Hw10: TBA
T	Apr 21	26: Queue's, heaps, hash tables	
Th	Apr 23	27: Graphs	
T	Apr 28	28: Graphs	
Th	Apr 30	29: TBA	
T	May 5	30: Review	
W	May 13	Final Exam, 1:00-3:00 pm	

Attendance Policy

- The UA's policy concerning Class Attendance and Administrative Drops is available at: https://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop. I administratively drop students for excessive absence, including missing the first day.

- The UA policy regarding absences on and accommodation of religious holidays is available at http://deanofstudents.arizona.edu/policies-and-codes/accommodation-religious-observance-and-practice.

- Absences pre-approved by the UA Dean of Students (or Dean designee) will be honored. See: https://deanofstudents.arizona.edu/absences.

Grading Policy

- University policy regarding grades, including the grades of incomplete (I) and withdrawal (W), and grading systems is available at: https://catalog.arizona.edu/policy/grades-and-grading-system. Grades of I or W will be awarded only in accordance with University policy.

More UA Policies.

- UA Non-discrimination and Anti-harassment policy: http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy

- Confidentiality of Student Records: https://www.registrar.arizona.edu/personal-information/family-educational-rights-and-privacy-act-1974-ferpa

- General policies: http://deanofstudents.arizona.edu/policiesandcodes

- More on policies and procedures: http://catalog.arizona.edu/2015-16/policies/aaindex.html

- Student Assistance and Advocacy information is available at: http://deanofstudents.arizona.edu/student-assistance/students/student-assistance

- Threatening behavior: http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students

- Student code of conduct: https://public.azregents.edu/Policy%20Manual/5-308-Student%20Code%20of%20Conduct.pdf

- Final exam rules: https://www.registrar.arizona.edu/courses/final-examination-regulations-and-information

- Final exam schedule, http://www.registrar.arizona.edu/schedules/finals.htm

Academic Integrity: In general, students are expected to follow the University of Arizona Code of Academic Integrity: http://deanofstudents.arizona.edu/codeofacademicintegrity.

Here is the section of the University's Code of Academic Integrity entitled “Prohibited Conduct":

> *Students enrolled in academic credit bearing courses are subject to this Code. Conduct prohibited by this Code consists of all forms of academic dishonesty, including, but not limited to:*
>
> 1. *Cheating, fabrication, facilitating academic dishonesty, and plagiarism as set out and defined in the Student Code of Conduct, ABOR Policy 5-308-E.6, E.10, and F.1*
> 2. *Submitting an item of academic work that has previously been submitted or simultaneously submitted without fair citation of the original work or authorization by the faculty member supervising the work.*
> 3. *Violating required disciplinary and professional ethics rules contained or referenced in the student handbooks (hardcopy or online) of undergraduate or graduate programs, or professional colleges.*
> 4. *Violating discipline specific health, safety or ethical requirements to gain any unfair advantage in lab(s) or clinical assignments.*
> 5. *Failing to observe rules of academic integrity established by a faculty member for a particular course.*
> 6. *Attempting to commit an act prohibited by this Code. Any attempt to commit an act prohibited by these rules shall be subject to sanctions to the same extent as completed acts.*
> 7. *Assisting or attempting to assist another to violate this Code.*

Classroom Behavior. This is a professional environment and I expect you to behave accordingly. Failure to do so will, at my discretion, result in a lower final grade for the class, in addition to the penalties described below. Students are expected to abide by the university's conduct policies (links above) and to be generally polite, respectful, and considerate of others. Disrespectful behavior includes side conversations, the use of cell phones or other electronic devices (unless specifically working on class related material, e.g. taking notes on your laptop) in the classroom during class hours, and rude emails. Please put your phones on vibrate or turn them off. If you are distracting me, the SL's, or other students, you will get one warning. A second infraction will result in you being asked to leave and a getting a written warning that will be copied to the Dean of Students. Third time results in a Student Code of Conduct complaint, which you really don't want. Step one may be skipped depending on the severity of the behavior. http://policy.arizona.edu/education-and-student-affairs/disruptive-behavior-instructional-setting.

Special Needs and Accommodations. Students who need special accommodation or services must register with the Disability Resources Center (DRC):

Disability Resources Center
1224 East Lowell Street, Tucson, AZ 85721
(520) 621-3268
FAX (520) 621-9423
e-mail: drc-info@email.arizona.edu
web: https://drc.arizona.edu/

You must also request that the DRC send official notification to your instructor of your accommodations needs as soon as possible. Please plan to meet with the instructor by appointment or during office hours to discuss accommodations and how the course requirements and activities may impact your ability to fully participate. The need for accommodations must be documented by the appropriate office.

Inclusive Excellence. This course supports elective gender pronoun use and self-identification; rosters indicating such choices will be updated throughout the semester, upon student request. As the course includes group work and in-class discussion, it is vitally important for us to create an educational environment of inclusion and mutual respect. Inclusive Excellence is a fundamental part of the University of Arizona's strategic plan and culture. As part of this initiative, the institution embraces and practices diversity and inclusiveness. These values are expected, respected and welcomed in this course. Additional resources:

Office of Diversity (http://diversity.arizona.edu/)
http://www.health.arizona.edu/counseling-and-psych-services
https://www.health.arizona.edu/oasis-sexual-assault-and-trauma-services

Subject to Change Statement. Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.

ISTA Competencies.

F1.1	Students will demonstrate understanding of the use of information and communication technologies and the implications of such use, for example: scientific and social uses of information, and social, cultural, and economic implications of digital life and culture.
F1.2	Students will demonstrate facility using basic research methods, for example: research design; statistics and analysis; organization, identification, and location of data and information including open- and closed-access sources; and/or presentation of findings in oral, written and multi-media form, including proper use of and citation of sources.
F1.3	Students will acquire the skills, knowledge and self-understanding to communicate with and effectively work and interact across cultures and with diverse people and groups.
F1.4	Students will demonstrate knowledge of career and further education options and opportunities open to them relative to their plan of study and will set goals and make plans beyond their expected graduation.
DAISBS2.1	Students will demonstrate the ability to conduct a research project using appropriate and ethical methods, including proper citation of sources.
DAISBS2.2	Students will establish the ability to exercise the four key techniques of computational thinking (decomposition, pattern recognition, abstraction, and algorithms) in solving information and data challenges.
DAISBS2.3	Students will acquire the skills of collecting, manipulating, and analyzing different types of data at different scales, and interpreting the results properly.
EV3.1	Students will be able to recognize and analyze ethical and policy concerns raised by new technologies and will be able to apply ethical thinking to real world cases and craft effective solutions.
EV3.2	Students will be able to identify and apply professional ethics and standards relevant to their career to aspirations.