SYLLABUS: INFO 1201

COMPUTATIONAL REASONING 1: EXPRESSION & MEDIA TRANSFORMATION

FALL 2016, 3 CREDITS, AUGUST 22–DECEMBER 15

COURSE COORDINATES:

Lecture: MWF 2:00pm–2:50pm, Chemistry 142

Lab sections: Mondays at various times, Armory 201 or Armory 211

INSTRUCTOR INFORMATION

Name: Dr. Danielle Szafir

Office Location: Environmental Design (ENVD) 201

My office hours are Wednesday 10am–11am and Thursday 12pm–1pm in ENVD 207 (and by appointment).

You can reach me at danielle.szafir@colorado.edu

Name: Dr. Stephen Voida

Office Location: ENVD 201

My office hours are Wednesday 9am–10am and Friday 11am–12pm in ENVD 207 (and by appointment).

You can reach me at svoida@colorado.edu

TEACHING ASSISTANT INFORMATION

Name: Xiaolei Huang (You can also call me "Douglas")

Lab sections: 011 and 031

My office hours are Wednesday 9am–10am and Friday 3pm–4pm in ENVD 207.

You can reach me at xiaolei.huang@colorado.edu

Name: Aaron Jiang

Lab sections: 061 and 071

My office hours are Tuesday 2pm–3pm, Thursday 1pm–2pm, and Friday 3pm–4pm in ENVD 207.

You can reach me at aaron.jiang@colorado.edu

Name: Mohammad Rifat (You can just call me "Rifat")

Lab sections: 021 and 081

My office hours are Tuesday 2pm–3pm, Wednesday 10am–11am, and Thursday 1pm–2pm in ENVD 207.

You can reach me at rashidujjaman.rifat@colorado.edu

Name: Jason Zietz

Lab sections: 041 and 051

My office hours are Tuesday 11am–12pm, Wednesday 11am–12pm, and Thursday 11am–12pm in ENVD 201/207.

You can reach me at jason.zietz@colorado.edu

Course Information

Course description and purpose: INFO 1201 introduces principles of computational thinking through the manipulation, transformation, and creation of media artifacts, such as images, sounds, and web pages. Students will be exposed to a high-level overview of algorithms, functions, data structures, recursion, and object-oriented computer programming through a series of assignments that emphasize the use of computation as a means of creative expression.

This course has no pre- or co-requisite registration requirements.

Learning Goals

Upon completing this course, you will be able to:

- Develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions
    - Formulate program definitions suited for technology-assisted methods such as data analysis, abstract modeling, and algorithmic thinking in exploring and finding solutions
    - Break problems into component parts, extract key information, and develop descriptive models to understand complex systems or to facilitate problem-solving
    - Understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions
- Understand basic programming and computational techniques for working with digital information using the Python programming language
- Employ and manipulate basic computational representations of media artifacts
- Apply fundamental concepts of programming, including types, transformations, and organizations of data

Textbooks and Materials

Guzdial, M. J., & Erickson, B. (2015). *Introduction to Computing and Programming in Python (4th Ed.)*. Boston, MA: Pearson.

The textbook is available at the CU Boulder campus bookstore in both paperback and e-book formats. It is also available from most popular online retailers.

Assignments

Grades will be assigned based on a combination of short, weekly reading quizzes that are due at the beginning of each week (*before* the beginning of the lecture), six course "homework" projects, one take-home midterm exam, two in-class midterm exams, and a final examination. Students are expected to participate regularly in lecture and recitation sections. Your final grade will be determined based on the following distribution:

- Reading quizzes (10): 1% each, for a total of 10% (may drop 2 without explanation or penalty)
- Recitation/lab attendance (10, starting week two): 1% each, for a total of 10% (you may drop 3 attendance checks without explanation or penalty)
- Homework project assignments (6): 6.6% each, for a total of 40%
- Mid-term examinations (2 in-class and 1 take-home): 10% each, for a total of 30%
- Cumulative final examination: 10%

Homework project solutions will be submitted as ZIP files through D2L. Each submission should include the inputs that you used (e.g., source images or sounds), copies of the outputs that your program generates when it is run, your Python program code (with sufficient documentation), and a *readme.txt* file that states how to run your code and cites any sources that you used or individuals who assisted you in arriving at your solution.

Working Course Calendar

Date	Lecture Topic	Reading	Assignments
Aug. 22	Course introduction	(syllabus)	
Aug 24	What is Computer Science (and computational thinking) all about?	Chapter 1	Quiz 1 due
Aug. 26	Introduction to data and naming	Chapter 2 (2.1–2.4)	

Date	Lecture Topic	Reading	Assignments
Aug. 29	Naming, variables, and functions	Chapter 2 (2.5)	
Aug. 31	Strings and text	Chapter 3 (3.1)	Quiz 2 due
Sep. 2	Taking strings apart	Chapter 3 (3.2)	HW1 due (Introducing JES, writing Python programs)
Sep. 5	LABOR DAY BREAK		
Sep. 7	Taking strings apart: *for*	Chapter 3 (3.2)	
Sep. 9	HW1 and quiz reviews; String conditionals: *if*	Chapter 3 (3.2)	Quiz 3 due
Sep. 12	String helpers (split, lower, find); HW2 prep	Chapter 3 (3.2)	
Sep. 14	Strings and indices (reversing strings, creating cyphers, etc.)	Chapter 3 (3.2)	Quiz 4 due
Sep. 16	Constructing more complicated strings: deconstructing strings word-by-word	Chapter 3 (3.3–3.5)	HW2 due (Manipulating strings)
Sep. 19	Review of strings, exam prep		
Sep. 21	FIRST IN-CLASS EXAM		
Sep. 23	Exam review; Intro to images: picture and color representation	Chapter 4 (4.1–4.2)	
Sep. 26	Pictures as arrays: *for each*	Chapter 4 (4.3–4.4)	
Sep. 28	Whole-photo manipulation (negative, color balance, grayscale)	Chapter 4 (4.5–4.7)	Quiz 5 due
Sep. 30	Pictures as arrays: working with indices	Chapter 4 (4.8)	HW3 due (Working with images)

Date	Lecture Topic	Reading	Assignments
Oct. 3	Working with sections of images	Chapter 4 (4.8)	
Oct. 5	Overwriting the image array: basic copying and mirroring [FLEX SCHEDULE DAY]	Chapter 4 (4.8)	Quiz 6 due
Oct. 7	Pictures as arrays: comparing pixels with conditional manipulation	Chapter 5 (5.1–5.3)	HW4 due (*Homebrew Photoshop*)
Oct. 10	Chromakey and canvas manipulation	Chapter 5 (5.4–5.6)	
Oct. 12	Pictures as arrays: working with ranges; copying and mirroring	Chapter 6 (6.1–6.3)	Quiz 7 due
Oct. 14	Rotating and scaling	Chapter 6 (6.3)	
Oct. 17	Blending and blurring, drawing on images	Chapter 6 (6.4–6.6)	
Oct. 19	Review of images; take-home exam prep		TAKE-HOME EXAM out
Oct. 21	Images section close-out; computation with images in communication and media careers		TAKE-HOME EXAM due
Oct. 24	Exam review; Intro to sound: samples	Chapter 7 (7.1)	
Oct. 26	Sounds as arrays, whole-sound manipulation (e.g., volume)	Chapter 7 (7.2–7.3)	Quiz 8 due
Oct. 28	Normalizing and clipping	Chapter 7 (7.4)	
Oct. 31	Sounds, ranges, and indices: splicing, clipping, and copying	Chapter 8	
Nov. 2	Composing and blending (including echoes, time permitting)	Chapter 9 (9.1–9.3)	Quiz 9 due

Date	Lecture Topic	Reading	Assignments
Nov. 4	Sampling and synthesis [FLEX SCHEDULE DAY]	Chapter 9 (9.4–9.6)	HW5 due (Manipulating sounds)
Nov. 7	Reviews of sounds, exam prep		
Nov. 9	SECOND IN-CLASS EXAM		
Nov. 11	Exam review; sounds section close-out; computation with sounds in media and communication careers		
Nov. 14	Review of text, introduction to objects and text represented as lists	Chapter 11 (11.1–11.2)	
Nov. 16	Working with files as persistent lists of strings	Chapter 11 (11.3)	Quiz 10 due
Nov. 18	Getting text from the web; CSV file parsing	Chapter 12 (12.1)	
Nov. 21	FALL BREAK		
Nov. 23	FALL BREAK		
Nov. 25	FALL BREAK		
Nov. 28	Using text to shift between representations [FLEX SCHEDULE DAY]	Chapter 12 (12.2–12.4)	
Nov. 30	HTML and XML: structured text for the Web	Chapter 13 (13.1–13.2)	Quiz 11 due
Dec. 2	Parsing and writing HTML	Chapter 13 (13.2)	HW6 due (Scraping and working with Web data)
Dec. 5	Structured text section close-out; computation with structured text in communication and media careers		
Dec. 7	Speed/efficiency [FLEX SCHEDULE DAY]	Chapter 15	Quiz 12 due
Dec. 9	Course wrap-up and final exam review		

Date	Lecture Topic	Reading	Assignments
Dec. 15 (Thursday)	**Final examination: 1:30pm–4:00pm, CHEM 142**		

Any changes to this (working) schedule will be discussed in lecture and posted to the course D2L site. It is each student's responsibility to attend to any changes in class topics or assignment due dates.

GRADING

This course will use a standard, 100-point grading scale:

93.0% and above: A
90.0%–92.9%: A-
87.0%–89.9%: B+
83.0%–86.9%: B
80.0%–82.9%: B-
77.0%–79.9%: C+
73.0%–76.9%: C
70.0%–72.9%: C-
67.0%–69.9%: D+
63.0%–66.9%: D
60.0%–62.9%: D-
Below 60.0%: F

Assignments are expected to be submitted on time. There is no "late" policy for quizzes; quizzes that are submitted late will not be counted toward your final course grade. Homework project submissions and your take-home midterm exam will be assessed a 10%-per-day late penalty if turned in after the deadline; assignments submitted more than 48 hours late will be graded but not counted toward your final course grade.

USING DESIRE TO LEARN AND OTHER TECHNOLOGIES

This course will use Desire to Learn (D2L; http://learn.colorado.edu) as the primary instructor–student communication hub. Quizzes will be proctored via your D2L account, homework assignments and the take-home exam will be collected via D2L Dropbox submissions, and any changes in this syllabus will be communicated via D2L broadcast postings. The instructors will also monitor online forums hosted as part of the D2L course site to address questions or needed clarifications about course content, assignments, etc. We strongly recommend that you check in on the D2L course site at least once during each class meeting day to stay apprised of any course- or assignment-related updates.

We will also be using JES, the *Jython Environment for Students* software, as the primary tools for developing and testing media-computation–enabled Python programs during the course. You are welcome to download and run this (free) software on your own computer or laptop; it will also be available for your use during lab meeting time and open lab sessions on the desktop computers in the CMCI computing labs (Armory 201 and Armory 211).

You may also choose to use *Pythy* (https://pythy.cs.vt.edu/), a web-based alternative to the *JES* software environment. However, please be aware that this research software is **not** hosted at the University of Colorado and may not include full support for all of the media computation functions required for the assignments in this course.

Accommodation Statement

We are committed to providing everyone the support and services needed to participate in this course. If you qualify for accommodations because of a disability, please submit to one of your professors a letter from Disability Services in a timely manner (for exam accommodations provide your letter at least one week prior to the exam) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact Disability Services at 303-492-8671 or by e-mail at dsinfo@colorado.edu. If you have a temporary medical condition or injury, see Temporary Injuries guidelines under the Quick Links at the Disability Services website and discuss your needs with us.

Religious Observances

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required assignments/attendance. If this applies to you, please speak with one of us directly as soon as possible at the beginning of the term.

Classroom Behavior

Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, color, culture, religion, creed, politics, veteran's status, sexual orientation, gender, gender identity and gender expression, age, ability, and nationality. Class rosters are provided to the instructors and TAs with each student's legal name. We will gladly honor your request to address you by an alternate name or gender pronoun. Please advise us of this preference early in the semester so that we may make appropriate changes to our records. For more information, see the policies on class behavior and the student code.

Discrimination and Harassment

The University of Colorado Boulder (CU Boulder) is committed to maintaining a positive learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct, discrimination, harassment or related retaliation against or by any employee or student. CU's Sexual Misconduct Policy prohibits sexual assault, sexual exploitation, sexual harassment, intimate partner abuse (dating or domestic violence), stalking or related retaliation. CU Boulder's Discrimination and Harassment Policy prohibits discrimination, harassment or related retaliation based on race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. Individuals who believe they have been subject to misconduct under either policy should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127. Information about the OIEC, the above referenced policies, and the campus resources available to assist individuals regarding sexual misconduct, discrimination, harassment or related retaliation can be found at the OIEC website.

Honor Code

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the academic integrity policy of the institution. Violations of the policy may include: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access, clicker fraud, resubmission, and aiding academic dishonesty. All incidents of academic misconduct will be reported to the Honor Code Council (honor@colorado.edu; 303-735-2273). Students who are found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code Council as well as academic sanctions from the faculty member. Additional information regarding the academic integrity policy can be found at honorcode.colorado.edu.

The first instance of academic dishonesty will result in a grade of 0 on the assignment in question. Subsequent violations will result in a failing grade for the course.