Computer Science 2120a/9642a/ Digital Humanities 2220a — Fall 2018

Course Description

Imagine you have just finished a lengthy set of experiments using your favourite experimental modality and piece of equipment. You'd like to analyze this data using a specific statistical technique implemented in a software package to which you have access… but the software won't load the file from your experimental equipment. With just a little bit of knowledge of scripting and understanding of data formats, you could solve this problem yourself in a matter of minutes.

Or perhaps you're interested in identifying predictive patterns in large data sets. Maybe heat waves are a good predictor of civil unrest and you've got access to historical weather and social media data. With the right programming tools, you could organize the data and test your hypothesis on a Saturday morning.

This course sets out to accomplish two primary goals:

1. To teach basic information processing skills to students in any discipline. This includes exposure to the core concepts of **algorithms and data structures** leading to the ability to write simple programs and scripts. By writing simple programs and scripts to address typical problems that arise in applied research, the student will discover the enabling power of programming.
2. To provide a broad overview of the field of **information science**, focussing on those areas that are most relevant to quantitative research. The goal here is simply to generate awareness of existing techniques, tools and approaches that may be of relevance to the student in their future work.

Officially, this course has 3 "lecture" hours and 2 "tutorial" hours. In practice, I'm not going to be doing much "lecturing"; we'll be trying to *do* stuff, not just talk/listen about stuff. The lecture hours will consist of small microlectures followed by immediate hands-on application of what we've just learned. The designated lab hours will give you a chance to practice problem solving in large groups.

Prerequisites

- An interest in learning a bit about what programming can do for *you*
- Willingness to dive into a different mode of thinking and problem solving

Instructor

- Ethan Jackson
- Office: MC 27C (down the hall from the Grad Club)
- Office hours: **Tuesdays 1pm-2pm**
- Email: ejacks42 at uwo.ca

Teaching Assistants

- Reco King (rking55 at uwo.ca)
- Jacob Hunte (jhunte85 at uwo.ca)
- Marios Grigoriou (mgrigori at uwo.ca)

Lecture

- Tuesdays, 10:30-12:30, UCC-56
- Thursdays, 1:30-2:30, UCC-56

Tutorial / “Lab”

- Thursdays, 10:30–12:30, AHB–1B04 (Sec 002)
- Thursdays, 3:30–5:30, AHB–2B04 (Sec 003)

Website

- This website
- OWL

Textbook and Lecture Notes

Lecture notes will be posted to the website. The textbook is available online, for free:

How to think like a Computer Scientist

Don’t let the “free” part fool you – it’s an excellent text.

Topics

We will not necessarily cover everything listed here, nor necessarily in this exact order. Due to the way the class is being taught, the material covered will adapt to the interests, and abilities, of the class.

- Introduction to Programming
- Variables and statements
- Strings
- Input/output
- Conditionals
- Iteration
- Tuples
- Traversing and slicing
- Functions and types
- Recursion
- Numbers: Floating point arithmetic
- Successive approximation
- Lists
- Dictionaries
- Binary search
- Sorting Algorithms
- Data Visualization
- Machine Learning

Student Evaluation (Tentative Dates)

	Worth	Due/Date
Assignment 1	10%	Fri Sept 28 at 5pm
Assignment 2	10%	Fri Oct 26 at 5pm
Assignment 3	10%	Fri Nov 9 at 5pm
Assignment 4	20%	Fri Dec 7 at 5pm
Lecture Activities	10%	Fridays at 5pm
Final Written Exam	40%	TBA – During Exam Period

- IMPORTANT NOTE: To be eligible to receive a passing grade in the course, your mark on the final exam must be at least 40%, and your weighted average on the assignments must be at

least 40%. Otherwise, the maximum overall mark you can receive is 45%. To be eligible to receive a grade of 60% or higher, your mark on the final exam must be at least 50%, and your weighted average on the assignments must be at least 50%. Otherwise, the maximum overall mark you can receive is 58%.

Assignment Submission

- Instructions for the submission of assignments will be posted on the course website. It is each student's responsibility to read and follow the instructions. Failure to follow the submission instructions may result in the assignment receiving a mark of zero.
- You will be required to submit each programming assignment electronically. Details will be given in the assignment descriptions. We reserve the right to use similarity detection software to detect possible plagiarism.

Assignment Due Dates

- No submissions will be taken after the due date; there are no late submissions. All submissions after the exact due date will result in a mark of zero and will not be evaluated.
- No extensions will be given for assignments; however, if a student has serious medical or compassionate grounds, they should take supporting documentation to the Office of the Dean of their faculty and their instructor will be contacted.

Assignment marking

- Assignments are marked by the Teaching Assistants, who follow marking schemes provided by instructors.
- A request for adjustment in an assignment mark must be made within 2 weeks of the date on which it was first available after marking. (Beyond that date, regrading will not be considered, regardless of whether you retrieved your assignment.) Such a request must be submitted to the course instructor in writing, and must include specific reasons for the request. The request must be accompanied by all materials that were originally handed in, as well as the original marker's grade summary sheet. The instructor will inform you by email when the reevaluation process is complete.
- It is each student's responsibility to keep up-to-date backups of assignment files in case of system crashes or inadvertently erased files. Students must keep copies of all material submitted, as well as the actual graded assignment, to guard against the possibility of errors in recording marks. It is not safe to discard these materials until you are satisfied that your final mark for the course has been computed properly.

Tutorials

- Tutorials are an opportunity to work on problems with the TA and your peers.
- Before tutorials begin (on Thursdays) a *problem of the week* will be posted on the course website.
- During tutorials, you're encouraged to work on these problems together in groups.
- There is no submission required for these problems.
- You can also work on your lecture activity, assignments, other problems, and ask the TA for general help.
- Tutorial attendance is optional.

Lecture Activities

- In addition to the (many) coding examples that we'll work through during lecture, during every Tuesday lecture there will be a short break (10 minutes or so) for a Lecture Activity.
- Lecture Activities will be coding problems related to the material discussed that day, written on the whiteboard.
- Solutions for Lecture Activities must be submitted via OWL by **Friday at 5:00pm each week**.
- Lecture Activity solutions don't need to be perfect – but they must be a reasonable attempt at solving the problem according to the TA's discretion.
- You are encouraged to discuss solutions with your peers – but each student must submit their own solution.
- There will be 12 Lecture Activities in total – you only need to submit 10 to get full marks (10% of your grade).

Final

- A written final exam will be scheduled by the Registrar's Office during the exam period (December 10 to 21).
- It will be open-book including cheat sheets – but no electronic devices will be allowed.

Ethical Conduct

All assignments are individual assignments – each student submits their own solution.

But… real life is a team sport… so I'm not interested in penalizing people for peer learning and teaching; skills which are even more important to learn than computer programming. (In fact, if you dig in to the educational literature, you'll find a pretty strong consensus that peer learning is *one of the most effective types of learning*, second only to… *peer teaching*. So go ahead and help each other out on assignments. You'll all learn more that way.)

I ask only one thing: when you submit your assignment, include in your documentation the names of those with whom you worked. Under no circumstances will this be used against you. If you worked with 10 people, write 'em all down. You'll get the same grade as if you did it yourself. I ask this for one simple reason: if there are folks in the class who are really helping out a lot of other people, I want the opportunity to recognize their contribution. **Failing to give credit to those you worked with may be grounds for a plagiarism investigation.**

Just keep in mind that you need to work through a problem in order to understand it, and your solution. You'll need to put a lot of effort into the assignments to understand the tools you're using – and to do well on the final.

I'm required by departmental policy to include these links, but, with the rules described above, I think you'd have to try *really hard* to do something "unethical" in this course:

- http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf

Tutoring

The role of tutoring is to help students understand course material. Tutors should not write assignments or take-home tests for the students who hire them.

Each term, the Department posts a list of students interested in acting as tutors for various courses. Tutors are screened for marks in an effort to determine their suitability. The Department accepts no responsibility for problems that may arise between students and their tutors.

If you need help though, please just come by my office. Or go see the TAs. We're here to help and most TA office hours are criminally underused (unless there's an assignment due… then it looks like

Richmond Street at 4:45pm).

Academic Accommodation for Medical Illness, Disabilities, or Religious Holidays

If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to your Dean's office as soon as possible and contact your instructor immediately. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved and the instructor has been informed. In the event of a missed final exam, a "Recommendation of Special Examination" form must be obtained from the Dean's Office immediately. For further information please see: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_illness.pdf

A student requiring academic accommodation due to illness should use the Student Medical Certificate when visiting an off-campus medical facility or request a Record's Release Form (located in the Dean's Office) for visits to Student Health Services. The form can be found here: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_illness.pdf

Learning-skills counsellors at the Student Development Centre (http://www.sdc.uwo.ca) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counseling.

Students who are in emotional/mental distress should refer to Mental Health@Western (http://www.health.uwo.ca/mental_health) for a complete list of options about how to obtain help.

Additional student-run support services are offered by the USC, http://westernusc.ca/services.

The website for Registrarial Services is http://www.registrar.uwo.ca.

The form for accomodation for students with disabilities can be found here: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_disabilities.pdf

The form for accomodation religious holidays can be found here: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf

Accessibility Statement

Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation."

Addendum

The UWO Senate Academic Handbook has specified that the following points should be added to all course outlines:

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

Plagiarism: Students must write their essays and assignments in their own words. Whenever students take an idea, or a passage from another author, they must acknowledge their debt both by using

quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar).

Plagiarism Checking: The University of Western Ontario uses software for plagiarism checking. Students may be required to submit their written work and programs in electronic form for plagiarism checking.

Prerequisites for a course: Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you will be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Exam checking: Use may be made of software to check for unusual coincidences in answer patterns that may indicate cheating.