EEB125 Draft Syllabus

November 23, 2021

EEB125: Introductory Computation and Data Science for the Life and Physical Sciences

Teaching Team

- Caroline Parins-Fukuchi

- Nathan Taback

- Paul Gries

- A large team of teaching assistants

Course Schedule

Lecture:

Day	Time	Location
Wednesday	13:00 - 15:00	UC140

Tutorials:

Day	Time	Section	Location
Thursday	12:00 - 13:00	0101	OI2205
Thursday	12:00 - 13:00	0201	OI2211
Thursday	12:00 - 13:00	0301	OI2279

Course Description and Learning Objectives

Life and physical scientists increasingly use big and complex datasets to answer questions about society and the natural world. In this course, students will develop introductory programming knowledge and data acumen to explore topics drawn from biology, chemistry, physics, and psychology. Students will learn to create and run computer programs, organize ideas using data to communicate clearly to others, break a complex problem into simpler parts, apply general data science principles to specific cases, distinguish causation from correlation and coincidence, and negotiate tradeoffs between different computational and statistical approaches.

In addition to statistical reasoning, learning from data involves computation and communication. We will use the Python programming language and environment for statistical computing, and

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tutorials will introduce students to communicating statistical knowledge. In addition to computer programming, learning from data involves statistical reasoning and communication.

Learning objectives

By the end of this course, you should be able to:

- Write computer programs in Python to prepare data for statistical analyses and visualizations.

- Write computer programs in Python to conduct a variety of statistical analyses in Python and provide an oral and written interpretation of the results.

- Identify appropriate uses of computational and statistical methods to answer life and physical sciences questions, including their strengths and limitations.

- Clearly communicate the results of a data analysis to both technical and non-technical audiences.

Evaluation

Assessment	Weight	Due Date	Time	Location
Weekly lab assignments	20%	Weekly	In tutorial	Tutorial
Term Test	25%	Feb. 15	10:00 - 12:00	TBA*
Final Project	20%	Week of April 4	TBA	TBA
Final Exam	35%	Scheduled by FAS	TBA	TBA

∗To Be Announced

Important note about tutorials

Your tutorial grade includes any assigned work that is due before tutorial and any work done during tutorial. Note that if you miss a tutorial, there is no way to make up this component of your mark.

Missed Test or Project

TBD

Marking Concerns

Any requests to have your test remarked must contain a written justification for consideration. Marking requests should be made within one week of receiving your assessment. *Please note* that we reserve the right to reconsider the marking of every question on your assessment when you re-submit.

How to communicate with your instructors

Questions about course material or organization, such as,

- What do I change the colour of my plotting symbol?
- How do I do question 3?
- When is the term test?

should be posted on the discussion forums or asked in person. Questions can be posted anonymously (so that the author is anonymous to other students but not to the instructors), if desired.

If your communication is private, such as, I missed the test because I was ill, then e-mail your instructor. If you missed a tutorial then e-mail your TA. Use your utoronto.ca e-mail account to ensure that your message doesn't automatically go to a Junk folder and include your full name and student number.

Academic Integrity

You are responsible for knowing the content of the University of Toronto's Code of Behaviour on Academic Matters.

As a general rule, we encourage you to discuss course material with each other and ask others for advice. However, it is not permitted to share complete solutions or to directly share code for anything that is to be handed in. When an assignment is required to be completed as a team, you may share solutions and code with other members of your team, but not with another team in the class. For example, "For question 2 what Python function did you use?" is a fair question; "Please show me your Python code for question 2" is not.

If you have any questions about what is or is not permitted in this course, please do not hesitate to contact your instructors.

Accessibility Needs   The University of Toronto is committed to accessibility. If you require accommodations for a disability, or have any accessibility concerns about the course, the class room, or course materials, please contact Accessibility Services as soon as possible: `accessibility.services@utoronto.ca` or http://accessibility.utoronto.ca

Your Responsibilities   The course is designed to actively engage you in the course material. We hope you'll find this course on social science, computation and data science interesting, challenging, and fun. In order for classroom sessions and tutorials to be effective, prepare by learning about the week's concepts through completing the recommended problems and readings.

Weekly Schedule

Class	Week	Topic
1	Jan. 10	Introduction
2	Jan. 17	Introduction to Python, and Jupyter notebooks
3	Jan. 24	Introduction to data wrangling using the pandas library
4	Jan. 31	Exploratory data analysis, describing and visualizing data
5	Feb. 7	Exploratory data analysis, describing and visualizing data
6	Feb. 14	Midterm test
No class	Feb. 21	**Reading week**
7	Feb. 28	Causation versus association in the Life and Physical Sciences
8	March 7	What is statistical significance?
9	March 14	Comparing Two Groups using simulation
10	March 21	Bootstrap Confidence Intervals
11	March 28	Statistical learning (linear/logistic regression)
12	April 4	Statistical learning (kmeans/pca)