

# cs199: Use and Abuse of Data: Critical Thinking in Science and Everyday Life

Instructor: Prof. Rebecca Hutchinson

Spring 2019

## Basics

- **Instructor:** Prof. Rebecca Hutchinson (rebecca.hutchinson@oregonstate.edu)  
www.engr.oregonstate.edu/~rah.
- **Class Meetings:** Monday/Wednesday/Friday, 2:00-2:50pm in KIDD 280.
- **Credits:** 3
- **Office Hours:** By appointment. In Prof. Hutchinson's office: KEC 2071.
- **Textbook:** None. Readings will be provided.
- **Prerequisites:** MATH 112 recommended.

## Course content

Critical thinking is an essential skill for the biological sciences. In addition, as consumers of information, we are inundated with data used to sway our opinions on human and ecosystem health as well on the value or safety of food and bioproducts. In this class, students will use biological datasets to learn to critically examine how data analysis can support legitimate conclusions from data and also how deceptive visualizations, misleading comparisons, and spurious reasoning can lead to false conclusions. Students will learn to analyze data to break down the logical flow of an argument and identify key assumptions, even when they are not stated explicitly. Students will learn in a collaborative, group-based setting to actively interpret and discuss the use of data to practice skills central to thinking critically about data. This class establishes a framework for cohort, collaborative learning.

This course uses some content from a course at the University of Washington (<http://callingbullshit.org/index.html>).

## Student Learning Outcomes

At the completion of the course, students will be able to:

1. Recognize weak and misleading arguments from data in their daily life.
2. Track arguments from data to the source to evaluate claims.
3. Distinguish aspects of arguments from data that may invalidate their conclusions from aspects of sound reasoning.
4. Deconstruct - both to a layperson and to a data scientist - errors and assumptions in arguments from data that alter the conclusions which may be drawn.
5. Reflect on roles and strategies for group work and communicate effectively to collaborate in accomplishing common goals.

## Evaluation of student performance

**Participation: 30% of final grade.** Participation will be judged based on contributions to class discussions and in-class exercises. Since participation is an important part of this class, **attendance is expected and any absences should be excused by the instructor before classtime.**

**Assignments: 40% of final grade.** Assignments will include a mix of in-class and out-of-class exercises and reading summaries.

**Projects: 30% of final grade.** There will be a final project done in small groups.

## Late policy

Late assignments will be accepted up to 24 hours following the due date for 90% credit and up to 48 hours following the due date for 50% credit.

## Learning resources

All learning materials will be made freely available by the instructor.

## Tentative Schedule

Available at <http://classes.engr.oregonstate.edu/eecs/spring2019/cs199-001/>.

## Students with Disabilities

Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at <http://ds.oregonstate.edu>. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

## Academic Misconduct

Academic or Scholarly Misconduct is prohibited and considered a serious violation of the Student Conduct Code. It is defined as an act of deception in which a Student seeks to claim credit for the work or effort of another person, or uses unauthorized materials or fabricated information in any academic work or research, either through the Student's own efforts or the efforts of another. For more information, please read the policy via the following link: <http://studentlife.oregonstate.edu/studentconduct/academicmisconduct>

## Classroom Policies and Learning Environment

It is expected that everyone will treat each other with common courtesy in the classroom and behave in a way that facilitates an effective learning environment. Information about the OSU student code of conduct is available at <http://studentlife.oregonstate.edu/studentconduct>. More specific policies will be implemented if the need arises.

## Community Statement

(Thanks to Eric Walkingshaw for this text.)

Every student should feel safe and welcome to contribute in this course. As the instructor, I will try to establish this tone whenever possible, but ultimately the responsibility for cultivating a safe and welcoming community belongs to the students-that means you!

Fortunately, being part of a safe and welcoming community is not too hard. A good place to start is to recognize (and continually remind yourself) of the following facts:

- Your classmates come from a variety of cultural, economic, and educational backgrounds. Something that is obvious to you may not be obvious to them.
- Your classmates are human beings with intelligence and emotions. This applies even if you are interacting anonymously on Canvas.
- Your classmates are here to learn. They have the right to pursue their education without being distracted by others' disruptive behavior, or made uncomfortable by inappropriate jokes or unwanted sexual interest.
- If each of us remembers these facts and act with corresponding decency, respect, and professionalism, the course will certainly be better for everyone.

Some students might be inclined to shrug this off and perhaps crack a joke about safe spaces or political correctness. If that's you, please also know that if you make a fellow student uncomfortable by mocking them, making inappropriate jokes, or making unwanted advances, that is harassment and will be taken seriously. (If you are a victim of harassment, please see the brief list of resources below.)

However, I hope that we can all approach this positively. Treat your classmates as respected colleagues, support each other when needed, have fun without spoiling it for anyone else, and everybody wins.

## What to do about harassment

If you are the victim of harassment in this class, there are several resources available to you:

- You may schedule a private meeting to talk to me.
- You may contact the University Ombuds Office (<http://oregonstate.edu/ombuds/>) for confidential guidance and advice.
- You may contact the Office of Equal Opportunity and Access (<http://eoa.oregonstate.edu/>) to file an informal or formal complaint. You may also want to read OSU's policies on bullying (<http://eoa.oregonstate.edu/bullying-policy>) and on sexual harassment and misconduct (<http://eoa.oregonstate.edu/sexual-harassment-and-violence-policy>).

Information about the OSU student code of conduct is available at <http://studentlife.oregonstate.edu/studentconduct>.

## Policy on Children in Class

(Thanks to Melissa Cheyney for this text.)

It is my belief that if we want women in academia, that we should also expect children to be present in some form. Currently, the university does not have a formal policy on children in the classroom. The policy described here is thus, a reflection of my own beliefs and commitments to student, staff and faculty parents.

- All exclusively breastfeeding babies are welcome in class as often as is necessary to support the breastfeeding relationship. Because not all women can pump sufficient milk, and not all babies will take a bottle reliably, I never want students to feel like they have to choose between feeding their baby and continuing their education. You and your nursing baby are welcome in class anytime.
- For older children and babies, I understand that minor illnesses and unforeseen disruptions in childcare often put parents in the position of having to choose between missing class to stay home with a child and leaving him or her with someone you or the child does not feel comfortable with. While this is not meant to be a long-term childcare solution, occasionally bringing a child to class in order to cover gaps in care is perfectly acceptable.

- I ask that all students work with me to create a welcoming environment that is respectful of all forms of diversity, including diversity in parenting status.
- In all cases where babies and children come to class, I ask that you sit close to the door so that if your little one needs special attention and is disrupting learning for other students, you may step outside until their need has been met. Non-parents in the class, please reserve seats near the door for your parenting classmates.
- Finally, I understand that often the largest barrier to completing your coursework once you become a parent is the tiredness many parents feel in the evening once children have finally gone to sleep. The struggles of balancing school, childcare and often another job are exhausting! I hope that you will feel comfortable disclosing your student-parent status to me. This is the first step in my being able to accommodate any special needs that arise. While I maintain the same high expectations for all student in my classes regardless of parenting status, I am happy to problem solve with you in a way that makes you feel supported as you strive for school-parenting balance. Thank you for the diversity you bring to our classroom!

## **Disclaimers**

The course plan above is subject to change. Students may vary in competency on learning outcomes, and students can only expect to achieve the stated learning outcomes if they honor course policies, attend class, complete assigned work, and meet all other course expectations.