

USC Dornsife College of Letters, Arts and Sciences

QBIO-115w – Ethics in Biology, Medicine, and Statistics (4 units) Spring 2025

Lectures: 12:30pm-1:50pm TTh

Location: RRI 421

Discussion: 11:00am-11:50am W

Location: RRI 421

Instructor: Dr. Jazlyn Mooney

Office Hours: Tuesday 2pm and by appointment

Office Hour Location:

Contact Info:

Instructor: Shirin Nataneli

Office Hours: Monday 11am-12pm

Office Hour Location:

Contact Info:

Course Description (short)

Introductory course in ethics through the lens of science that will navigate topics in eugenics, origins of scientific data, and importantly the frontiers of future research.

Course Description (full)

Biology, medicine, and statistics have each made a large impact on understanding life sciences and human disease. This impact has been bolstered over the last 20 years with the integration of information from all three fields and the advancement of genetics and computation. However, these fields are also deeply rooted in 19th century eugenics. Unfortunately, these ties percolated into foundational scientific data and were used to establish biased public policies with rise of eugenics movement. This course will critically reflect on the origins of each field through a scientific perspective and explore modern research practices that offer hope for an equitable future. We will use a mixture of readings, presentations, and discussions to navigate these topics.

Learning Objectives

By the end of this course, students will be able to consider how eugenics has shaped the foundation biosciences and statistics. Further, students will be able to think critically about the ethical implications of the history in each field and reflect on statistics, genetics, and medicine within a wider social context.

- Describe the history of the eugenics movement in America and how it has shaped the fields of medicine, computational biology, and statistics.
- Apply knowledge about the history of biology and statistics to contextualize major research and ethical advancements in the broader field.
- Determine who was affected, who might be affected, and the implications of biased biomedical research.
- Navigate through topics on debated issues involving race, ethnicity, and genetics.
- Synthesize salient insights using information from the course to thoroughly evaluate potential biases in medicine, scientific research, and conduct informed data analyses.

Required Materials

- *Eugenic Nation: Faults and Frontiers of Better Breeding in Modern America* (American Crossroads) Second Edition by Alexandra Minna Stern. [ISBN-13: 978-0520285064](#)
- *The Mismeasure of Man* Revised and Expanded Edition by Stephen Jay Gould. [ISBN-13: 978-0393314250](#)

New, used, and electronic copies are available from various online resources.

Description of Assessments for Mastery of Course Material and Grading of Assignments

Midterm Exams will be administered in-person on specific days during the class period (see Course Schedule below). Exams will be used to assess the students grasp of the learning objectives. Exams may include multiple choice, multiple answer, true or false, fill-in-the-blank, short answer, or essay questions. A request to take a make-up exam must be accompanied by evidence of a university-sanctioned excused absence (*e.g.*, a letter from a doctor, athletic release, etc.) and must be made before the date of the scheduled exam. Make-up exams may be given in a different format from that of the scheduled exam (*e.g.*, essay).

In-class and Discussion Assignments (Participation) the main determination of the participation grade will be discussions and small assignments. These assignments will be made in different forms such as, anonymous polls or small written/typed reflections where students addressed topics from that day's class. In the case students have an excused class sessions, students can submit these reflections to the instructor or TA later (before the next lecture occurs). Students are expected to actively participate in the class and discussion. Thus, the instructor will also consider your general engagement in the class (lectures, discussions, etc.) when deciding the participation grade.

In-class presentations each student will give **two or three group presentations (one/two on readings and a final science and society presentation)**. You and your classmates need to schedule at least one time slot during office hours (see info above for OH) at a minimum of one to two weeks before you present to go over slides and a general outline of topics and questions to be covered with Dr. Mooney. I will provide a **sign-up sheet for groups and list of potential topics for the final presentation**. Each group will decide on the topic and class session they would like to present on. Feedback on the presentation before class will be given during OH.

Term paper will be 4-6 pages (double-spaced). To assess mastery of the course material, this paper will be a critical analysis with supporting literature review on a science and society topic we covered in class. Students may also choose to write their term paper on their final presentation topic. The paper should not be a summary of readings and historical facts. The paper will require that the student reflect on topics covered in the class and find additional reading to develop their stance. A more detailed description of the term paper, topics, and presentations. The rubric for grading will be provided at a later time. The term paper is due during Final Exam week and will be submitted on Blackboard.

Grading Breakdown

Assignment	Points	Percentage of Grade
Attendance/Participation	150	15
Midterm 1	200	20
Midterm 2	150	15
In-class Presentations and Project	300	30
Term Paper	200	20
Total	1000	100

Grading Scale

Individual exams, participation, in-class presentations, and the term paper will be scored but not assigned a letter grade. Only the final point tally will be used to assign a letter grade.

Letter Grade	Point Ranges	Grade Point Value
A	930-1000	4.000
A-	900-929	3.667
B+	870-899	3.333
B	830-869	3.000
B-	800-829	2.667
C+	770-799	2.333
C	730-769	2.000
C-	700-729	1.667
D+	670-699	1.333
D	630-669	1.000
D-	600-629	0.667
F	<600	0.000

Late Work

All in-class participation assignments will be due by the end of class and cannot be made up if missed (unless there will be a known or excused absence, see *Participation*). However, the lowest three in-class assignments will be dropped to allow for some in-class absences.

Communication Policies

Students are *strongly* encouraged to raise any questions in regard to all matters involving course content or policy during Discussion section led by your TA. Should you have a question about specific course content and cannot attend Discussion, students are encouraged to submit their question to the course blog. Should you need to communicate with the instructor, please email the instructor from your USC email account *making sure to include in the subject line the course number and your full name* (expect significant delays or no response if this information is omitted). Simple questions will be answered by email but for more complex discussions students may be instructed to visit office hours. Best attempts will be made to answer all emails within 48 hours, 72 hours over a weekend and the work day following a holiday. Note that the instructor may not respond to nonemergency emails 24 hours preceding an exam and may not respond to emails sent from non-USC accounts.

To promote independence and critical thinking, students are encouraged to work through the following process for obtaining answers to course-related questions before contacting the instructor. First, consult the course syllabus. If you cannot find the answer you need, next please ask the question at Discussion section with your TA. If you still cannot find a satisfactory answer, email the instructor using your USC email *making sure to include the course number in the subject line*. In your email, please indicate the steps you have gone through to seek the answer for your question. Use your USC email account for all correspondence with the instructor.

Technology Policies

It is expected that students will use any internet-enabled device(s) to conduct research for course work and create their student presentations. You may bring your electronic devices to class. However, please make sure all electronic devices are silenced so as not to disturb classmates or the instructor during class. Use of electronic devices for other purposes during class is strongly discouraged and you may be asked to put a device away should your instructor deem it to be disruptive. If you require an internet-enabled device, please see the "Technological Proficiency and Hardware/Software Required" section above.

Attendance

Attendance of lectures is mandatory and will be assessed through in-class participation assignments. In-class assignments cannot be made up unless a student has been excused from such an assignment due to a university-sanctioned excuse (*e.g.*, illness, religious holiday, athletic event, etc.). If remote students are allowed to enroll and if they live in a time zone in which attending class would be extremely inconvenient, they need to contact the instructor to make other arrangements for the assessment of in-class skill sets.

Classroom Norms

At all times, students are expected to promote and support a positive learning environment, to listen actively and attentively, to follow best practices of inclusivity. Please be courteous and respectful to both the instructor, TA, and your classmates. The material in this class can be difficult to discuss and navigate. Therefore, it is vital that our classroom provides a comfortable learning atmosphere. Our classroom will follow a set of discussion norms dictated more thoroughly by USC's Center for Excellence in Teaching <https://cet.usc.edu/teaching-resources/a-menu-of-discussion-norms/>

Briefly, I expect students will listen to each other actively and attentively. We will hold our comments until the discussion period or reflections in-class. We will respect each other's views and during discussion. We will constructively challenge ideas not people, while avoiding inflammatory language. We also will not yell or interrupt each other. If there is an issue, we will all pause the discussion, and I will actively address the topic. Lastly, always remember that the classroom is a place for questions. Questions and clarification on background and material covered in class when you are confused are welcome.

Sharing of Course Materials Outside of the Learning Environment is Strictly Prohibited

USC has a strict policy (SCampus Section 11.12[B]) that prohibits sharing of *any* synchronous and asynchronous course content outside of the learning environment. Any student who violates this policy will be prosecuted to the maximum extent allowable by the USC Student Conduct Code, including failure of the course and suspension from the University.

Distribution or use of notes or recordings based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study is a violation of the USC Student Conduct Code. This includes, but is not limited to, providing materials for distribution by services publishing class notes. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relationship to the class, whether obtained in class, via email, on the Internet or via any other media. (See Section C.1 Class Notes Policy).

Tentative Course Schedule with additional reading materials listed below

DATE	LECTURE TOPIC
1/14/25	Introduction day
1/16/25	A Broad Overview of Eugenics
1/21/25	Molecular genetics and basic probability
1/23/25	Population Genetics from Mendelian to Complex Traits
1/28/25	The Human Genome and The Human Genome Diversity Project
1/30/25	Race and Ethnicity in Medicine and Genetics I: Race, Ancestry, Identity, and Genetics (Guest Lecture Dr. Roshni Patel)
2/4/25	Race and Ethnicity in Medicine and Genetics I: Race, Ancestry, Identity, and Genetics (Guest Lecture Dr. Roshni Patel)
2/6/25	Race and Ethnicity in Medicine and Genetics III: A Case Study with Cystic Fibrosis and Sickle Cell Anemia
2/11/25	Perspectives on the American Eugenics Movement (Polygeny and Craniometry)
2/13/25	Paul Broca and The Allure of (Mis)Using Statistics in Craniometry
2/18/25	The Hereditarian Theory of IQ
2/20/25	Review
2/25/25	Exam I
2/27/25	Engaging with our Historical Legacy: Higher education and Academic Journals
3/4/25	West Coast Eugenics and Race Betterment
3/6/25	Early Eugenics at the Border
3/11/25	How Hereditarianism Became Policy
3/13/25	History of science, the eugenics movement, human population genetics in the US (GSA panel)
3/18/25	Spring Break
3/20/25	Spring Break
3/25/25	Positive Eugenics and Health: Preserving California's Wilderness
3/27/25	Eugenic Sterilization and its History in California
4/1/25	Eugenics and Family Planning
4/3/25	Policy and Ethics I: Sex and Gender
4/8/25	Policy and Ethics II: Counter arguments to Hereditarianism and Current Scientific Standards
4/10/25	Exam II
4/15/25	Genetic Counseling (Guest Lecture Dr. Malika Kumar)
4/17/25	Policy and Ethics III: Bioethics and Community Engagement
4/22/25	Computational Biology I: AI in Biology, Medicine, and Genomics
4/24/25	Wrap-up week: How has History Shaped Ethical Practices in Computational Biology, Statistics, and Medicine
4/29/25	Student Presentations with Discussion
5/1/25	Student Presentations with Discussion

Additional reading Materials (subject to change and available online)

- Week 2
 - Graham Coop population genetics notes chapter 1-2 and portion of chapter 7
https://github.com/cooplab/popgen-notes/blob/master/release_popgen_notes.pdf
- Weeks 13-14
 - **13a:** Carlson, Jedidiah, et al. "*Counter the weaponization of genetics research by extremists.*" *Nature*. (2022): **444-447**.
 - **13b:** Bodmer, Walter, et al. "*The outstanding scientist, RA Fisher: his views on eugenics and race.*" *Heredity* 126.4 (2021): **565-576**.
 - **14a:** Cann, Howard M., et al. "*A human genome diversity cell line panel.*" *Science* 296.5566 (2002): **261-262**.
 - **14b:** Li, Jun Z., et al. "*Worldwide human relationships inferred from genome-wide patterns of variation.*" *Science* 319.5866 (2008): **1100-1104**.

Academic Accommodations

Any student requesting academic accommodations based on a disability are required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to the instructor as early in the semester as possible. DSP is located in Student Union (STU) 301 and is open 8:30 a.m. – 5:00 p.m. Monday – Friday. The phone number for DSP is (213) 740-0776.

Academic Integrity and Conduct

Students who violate University standards of academic integrity are subject to disciplinary sanctions, including failure of the course and suspension from the University. Given that dishonesty in any form harms not only the individual but other students and the University, academic integrity policies will be strictly enforced. Please familiarize yourself with the Academic Integrity guidelines found in the current SCampus (Student Handbook).

Plagiarism, *i.e.*, presenting someone else's ideas as your own, either verbatim or recast in your own words, is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, "Behavior Violating University Standards" policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. Additional information can be found in SCampus as well as university policies on scientific misconduct (policy.usc.edu/scientific-misconduct).

Academic Integrity Violations

Academic dishonesty/misconduct, e.g., plagiarism, cheating, unauthorized collaboration, etc., will not be tolerated. All academic integrity violations will result in a grade sanction and will be reported to the Office for Student Judicial Affairs. It is your responsibility to "reasonably" protect your own work from the plagiarism of others.

If plagiarism is detected on a group project, all members of the group will be held responsible.

You are expected to be familiar with the Academic Integrity guidelines found in the current SCampus. An electronic version is available at <http://usc.edu/scampus>.

Disruptive and Threatening Student Behavior

Behavior that persistently or grossly interferes with classroom activities is considered disruptive behavior and may be subject to disciplinary action. Such behavior inhibits other students' ability to learn and the instructor's ability to teach. A student responsible for disruptive behavior may be required to leave class pending discussion and resolution of the problem and may be reported to the Office of Student Judicial Affairs for disciplinary action.

Support Systems

Counseling and Mental Health - (213) 740-9355 – 24/7 on call studenthealth.usc.edu/counseling

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call suicidepreventionlifeline.org

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL), press “0” after hours – 24/7 on call studenthealth.usc.edu/sexual-assault

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) - (213) 740-5086 / Title IX – (213) 821-8298 equity.usc.edu, titleix.usc.edu

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298 usc-advocate.symplicity.com/care_report

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity | Title IX for appropriate investigation, supportive measures, and response.

The Office of Disability Services and Programs - (213) 740-0776 dsp.usc.edu

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Campus Support and Intervention - (213) 821- 4710 campussupport.usc.edu

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101 diversity.usc.edu

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call dps.usc.edu, emergency.usc.edu

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442- 120
- 24/7 on call dps.usc.edu

Non-emergency assistance or information.

Office of the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC) ombuds.usc.edu

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concerns.