Term Information

Effective Term	Spring 2025
Previous Value	*Autumn 2019*

Course Change Information

What change is being proposed? (If more than one, what changes are being proposed?)

Include in new GE Traditions, Cultures and Transformations Theme as an interdisciplinary team-taught course.

What is the rationale for the proposed change(s)?

Please see attached GE submission form.

What are the programmatic implications of the proposed change(s)?

(e.g. program requirements to be added or removed, changes to be made in available resources, effect on other programs that use the course)?

We anticipate no programmatic implications of this request.

Is approval of the requrest contingent upon the approval of other course or curricular program request? Yes

Please identify the pending request and explain its relationship to the proposed changes(s) for this course (e.g. cross listed courses, new or revised program)

MOLGEN 2690 -- cross-listed course

Is this a request to withdraw the course? No

General Information

Course Bulletin Listing/Subject Area	Philosophy
Fiscal Unit/Academic Org	Philosophy - D0575
College/Academic Group	Arts and Sciences
Level/Career	Undergraduate
Course Number/Catalog	2690
Course Title	Genes and Society
Transcript Abbreviation	Genes and Society
Course Description	This team taught, interdisciplinary course (crosslisted as MOLGEN 2690) provides science-based exposure to topics in classical and modern genetics but with an emphasis on social and ethical issues. Together we will discuss what genes are, and how they work, and how your genome influences traits and behaviors in the context of social beliefs and philosophy.
Semester Credit Hours/Units	Fixed: 4
Previous Value	*Fixed: 3*

Offering Information

Length Of Course	14 Week
Flexibly Scheduled Course	Never
Does any section of this course have a distance education component?	No
Grading Basis	Letter Grade
Repeatable	No
Course Components	Lecture
Grade Roster Component	Lecture
Credit Available by Exam	No

Admission Condition Course	No
Off Campus	Never
Campus of Offering	Columbus, Lima, Mansfield, Marion, Newark, Wooster
Previous Value	*Columbus*

Prerequisites and Exclusions

Prerequisites/Corequisites	
Exclusions	Not open to students with credit for MolGen 2690.
Electronically Enforced	Yes

Cross-Listings

Cross-Listings	Cross-listed in MolGen.

Subject/CIP Code

Subject/CIP Code	26.0801
Previous Value	*38.0101*
Subsidy Level	Baccalaureate Course
Intended Rank	Freshman, Sophomore, Junior, Senior

Requirement/Elective Designation

Traditions, Cultures, and Transformations; Interdisciplinary Seminar
The course is an elective (for this or other units) or is a service course for other units

Previous Value

The course is an elective (for this or other units) or is a service course for other units

Course Details

Course goals or learning objectives/outcomes

- Acquire and apply basic foundational knowledge in genetics
- Acquire and apply basic knowledge of ethics and the theory of value
- Learn terms, theories, and applications of genetic technologies and apply them to social, legal and ethical issues
- Use information and ideas from the class to assess the social, legal and ethical implications of a genetic principle/technology
- Understand and describe ethical considerations arising from genetics from multiple viewpoints, using information from diverse disciplines to formulate ethical decisions
- Use critical and logical thinking to analyze the relationships between science and technology and contemporary social issues
- Engage in critical and logical thinking and critical analysis
- Devise informed and meaningful responses to problems and arguments based on the interpretation of appropriate evidence
- Formulate considered and reasoned ethical decisions concerning issues related to genetics
- Better understand the need for integration across disparate disciplines when considering societally important topics

Content Topic List

- Fundamental principles of inheritance
- Fundamental principles of ethics
- Science and ethics of Gene:phenotype correlations
- Science and ethics of sex determination/gender/sexuality
- Science and ethics of Genetic modification and gene editing
- Science and ethics of Altruism
- Science and ethics of genetic and personalized medicine
- Science and ethics of genetic privacy and consent concerns
- Science and ethics of race

Sought Concurrence

No

Attachments

- 2690 Sample Syllabus for TCT theme 9.4.2024.pdf: Sample Syllabus
  (Syllabus. Owner: Shuster,Amy Lynne)
- MOLGEN_PHILOS 2690 submission-traditions.pdf: TCT submission form
  (Other Supporting Documentation. Owner: Shuster,Amy Lynne)
- MOLGEN_PHILOS 2690 Interdisciplinary-integrated-collaborative-teaching.pdf: HIP explanation
  (Other Supporting Documentation. Owner: Shuster,Amy Lynne)
- Cover letter and additional materials for 2690 GEN submit 043024.pdf: Cover Letter
  (Other Supporting Documentation. Owner: Shuster,Amy Lynne)

Comments

- Please revise. *(by Lin,Eden on 09/05/2024 09:16 AM)*

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Shuster,Amy Lynne	09/04/2024 03:49 PM	Submitted for Approval
Revision Requested	Lin,Eden	09/05/2024 09:16 AM	Unit Approval
Submitted	Shuster,Amy Lynne	09/09/2024 10:37 AM	Submitted for Approval
Approved	Lin,Eden	09/09/2024 11:33 AM	Unit Approval
Approved	Vankeerbergen,Bernadette Chantal	09/19/2024 12:22 PM	College Approval
Pending Approval	Jenkins,Mary Ellen Bigler Hanlin,Deborah Kay Hilty,Michael Neff,Jennifer Vankeerbergen,Bernadette Chantal Steele,Rachel Lea	09/19/2024 12:22 PM	ASCCAO Approval

THE OHIO STATE UNIVERSITY

Dear members of the General Education and Themes panels

The Departments of Molecular Genetics and Philosophy are delighted to submit updated materials for the interdisciplinary course MolGen/Philos 2690 "Genes and Society" for approval as a 4-credit hour General Education course in the "Traditions, Cultures, and Transformations" Theme.

As updated, this course qualifies as a four-hour theme course as an Integrative and Interdisciplinary course co-taught from two diverse departments: Molecular Genetics and Philosophy. The instructional teams (Cole from MolGen and D'Arms or Howard for Philosophy) have offered the 3-credit version of the course four times. Significant alterations in student expectations compared to the initially approved course will set the course up to complete the common GenEd Learning goals as well as the Theme goals for Traditions, Cultures and Transformations. These changes include:

- Higher emphasis on guided group discussions that allow students to integrate and expand on the themes of the course
- Additional short writing exercises that give students opportunities to contextualize their new knowledge in light of information from past courses and their lived experience, and to communicate about important social discussions at the intersection of genetics and philosophy with audiences that are different from them.
- A re-envisioning of the major class project to expand our expectations (including class poster presentations and increased length of the final paper).
    - This ongoing project, in which students identify a topic early in the semester and do ongoing research across several weeks, provide students with an opportunity to engage in self-directed scholarly research in an area of personal interest.
    - By identifying and defending a stance on a difficult topic, students have the opportunity to refine their own thinking and respectfully engage with counterarguments from people who might disagree.
    - This project provides opportunities for students to present their work in multiple formats including a poster presentation and a final scholarly paper, giving them experience in distinct modes of presentation and in presenting for distinct audiences.
    - Students are also expected to provide feedback for peers at the poster and rough draft stage, giving them an opportunity to engage in scholarly discussion about topics of interest to others in the class.

These new expectations increase the student workload and qualify the course as a four credit-hour class.

A sample syllabus for the four credit-hour course has been submitted to the curricular site (the sample uses SP2024 dates for convenience), and the submitted syllabus includes the expectations for the changes outlined above. This packet also includes the approved non-GenEd syllabus, which is included in this packet for comparison purposes to highlight the changes outlined above which increase student workload expectations. We also link to a

limited number of sample module closing activities, short writing project prompts, and a closing activity that support student progress towards the GenEd themes ELOs.

We look forward to the panel's input.

Sample Module closing activities
Sample prompts for short writing exercises
Class closing activity

Prior (non-GenEd) approved syllabus for comparison

Sincerely,

Susan Cole, Ph.D.
Professor and Chair of Molecular Genetics

Justin D'Arms, Ph.D.
Professor and Interim Chair of Philosophy

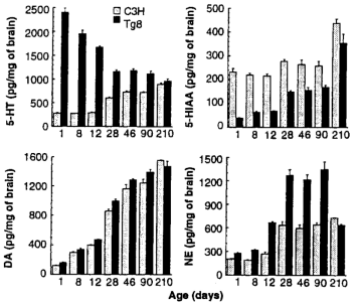
Sample Module Closing activities

Sample closing activity for Module on Behavioral Genetics and Moral Responsibility:

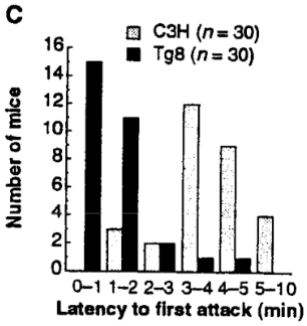
Consider the following data:

Monoamine oxidase A (MAO-A) is an enzyme that normally functions in neurons to break down several neurotransmitters including serotonin, dopamine and norepinephrine. These neurotransmitters have been variously linked to aggression, cognition and emotion, thus we anticipate that individuals with **lower** levels of MAO-A might have **higher** baseline levels of these neurotransmitters. The MAOA gene is on the X chromosome.

Several researchers have examined mouse models that do not express the mouse version of MAOA. These strains exhibit impulsive and aggressive behavior. For example, Cases et al. 1995 (DOI:10.1126/science.7792602) identified mutant mice with no MAOA activity. These mice have increased amounts of CNS serotonin (5-HT), and Norepinephrine (NE) at many timepoints after birth (note that the black bars are the MAOA mutant mice and the grey bars are wild type) while levels of 5-HIAA (a breakdown metabolite of serotonin) are decreased.

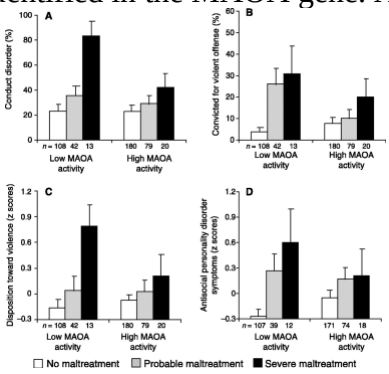


MAOA mutant mice also exhibit increased aggression. For example wild type male mice will frequently attack intruders placed in their home cage. But when an "intruder" mouse was placed in the home cage of a mutant mouse, it usually took less than 3 minutes for the mutant male to attack (black bars), while it takes 3-10 minutes for a wild type male to attack in intruder (white bars)



The MAOA gene has been implicated in a human syndrome called Brunner Syndrome. This X-linked syndrome is characterized by impulsive aggressiveness and mild cognitive deficits. It was first described in a large Dutch family, with affected males exhibiting impulsive antisocial behaviors including arson, attempted rape, and exhibitionism. Mutations in the coding sequence of the MAOA gene were identified in this family that cause a truncation of the protein.

Another set of possibly functional polymorphisms have been identified in the MAOA gene. A VNTR in the promoter consists of a 30 bp sequence that is variably present in 2, 3, 3.5, 4, or 5 copies (alleles called 2R, 3R, 3.5R, 4R, and 5R). The 2R, 3R and 5R alleles are associated with lower transcription, while the 3.5R and 4R repeats are associated with higher transcription. One study (Caspi et al. DOI: 10.1126/science.1072290) indicated that alleles associated with low transcription (collectively MAOA-L) are associated with increased antisocial behavior, conduct disorders, and violent delinquency, but only in males who had been maltreated in childhood. Replication studies were less clear, suggesting the genetic impact may be complex.



More recent work has included genotype at MAOA as one component of various polygenic risk scores (PRS) that correlate with aggression (For example Barnes et al 2019 (https://doi.org/10.1016/j.avb.2019.07.002shaw) develop a PRS that in their study correlates with lifetime

risk of incarceration in males, such that an increase in the PRS by one standard deviation correlates with a 15% increased risk of experiencing incarceration.)

Links between genotype at MAOA and legal culpability.

Survey-based studies asking judges to make hypothetical decisions found that judges in the U.S. imposed modestly shorter sentences if the case included genetic information related to MAOA genotype and its effects on behavior (Aspinwall, Brown, & Tabery, 2012), while German judges instead ordered more involuntary psychiatric hospitalizations instead of imposing shorter sentences (Fuss, Dressing, & Briken, 2015).

Evidence regarding MAOA has been referenced in several cases. In general, several possible outcomes were seen: in some cases the evidence was ruled inadmissable, in some cases the evidence was introduced during the guilt phase, in some cases evidence was introduced during the sentencing phase, after guilt was determined. Here are a handful of real outcomes:

In State v. Yepez (2015), Yepez was charged with strangling and then burning the body of his girlfriend's step-grandfather following an argument (Wilson, 2015). Before trial, the defense attempted to introduce information about the MAOA-L genotype (ie having a MAOA genotype associated with **L**ow transcription). After testimony from both sides the judge concluded that the evidence linking MAOA-L to aggression was not sufficient, and did not meet standards for scientific evidence. The judge excluded this line of evidence, and the accused was found guilty of second-degree murder. An Appeals court later ruled that the lower court abused its discretion by excluding scientific testimony, but that no harm had been done because the finding of second-degree murder does not require proof of premeditation. In 2021, the New Mexico Supreme Court rejected a request for a new trial.

In State v. Waldroup (2011). Waldrop was charged with murdering his wife's friend and attempting to murder his wife. Evidence was presented to the jury that Waldroup carried the MAOA-L genotype and had experienced maltreatment during childhood, arguing that this was a causative factor in the crimes. Although Waldroup was originally charged with first degree murder, the jury found him guilty of lesser offences of voluntary manslaughter and attempted second-degree murder. He was sentenced to thirty-two year in jail

In People v. Adams (2014), the defendant was accused of the unprovoked shooting and killing of three members of a rival gang. Though this evidence was not allowed during the guilt phase, during the sentencing phase an expert testified that Adams carried the MAOA-L genotype, and had been severely maltreated as a child, suggesting that the increased tendency for antisocial provided mitigating circumstances. The court was apparently not impressed by this argument, and imposed the death penalty.

Part 1

Use the information on the circulated document and any other information you wish (you are permitted to look at linked documents or do your own supplemental searching online), and discuss the following:

Scientifically, what do you think of the link between MAOA-L genotypes and propensity for violence? Things to consider might include how reasonable the mechanism is, how strong the effects are, whether you feel genotype alone is enough to make a strong prediction about an individual's personality etc.

Part 2:

Philosophically, we want you to take a point of view about the use of MAOA-L genotype in the justice system. Note that not everyone (or even anyone) at the table needs to agree that the position you put forward is the best or correct thing to do! For the purposes of this discussion, if you are unconvinced that the MAOA-L genotype is a strong predictor of aggressive behavior, you may assume the existence of a Polygenic Risk Score for aggression that has better predictive value. In order to get broader discussions, we are assigning you a position below.

Tables 1-3

1. Produce an informal argument supporting the conclusion that the presence of the MAOA-L genotype should be allowed to be introduced on behalf of defendants in the justice system and should mitigate guilt or punishment. (Keep it brief—a few sentences.) Discuss data or ideas that might be raised in support of your stance or as objections.

2. Consider some examples of other, non-genetic considerations that are commonly taken to mitigate responsibility (and, perhaps, punishment). In what ways does the MAOA-L genotype resemble and in what ways does it differ from such other mitigating factors?

3. Time permitting: put your argument in premise-conclusion format and try to make it valid.

Tables 4-7

1. Produce an informal argument supporting the conclusion that the presence of the MAOA-L genotype should NOT be counted in favor of defendants in the justice system. (Keep it brief—a few sentences.) Discuss data or ideas that might be raised in support of your stance or as objections.

2. Consider some examples of other, non-genetic considerations that are commonly taken to mitigate responsibility (and, perhaps, punishment). In what ways does the MAOA-L genotype resemble and in what ways does it differ from such other mitigating factors?

3. Time permitting: put your argument in premise-conclusion format and try to make it valid.

Sample Module closing activity for Module on Genetics and Social Identities: Sex, Sexuality, and Gender:

For decades, the International Association of Athletics Federations (IAAF), which governs track and field, and the International Olympic Committee (IOC) have played a significant role in policing which athletes are qualified to compete in "women's" competitions at the elite level. Through the mid 1940's the IAAF and IOC did routine genital checks of women competing in international games, and in the late 1960's started chromosome testing to prevent imposters and intersex competitors.

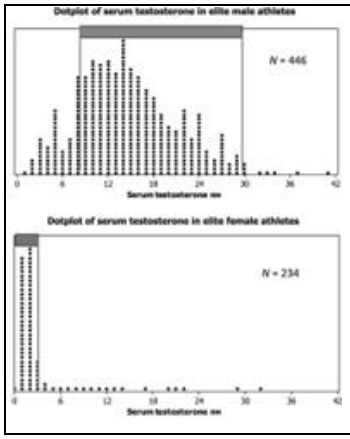
In 1985, these tests identified Spanish hurdler Maria Jose Martinez Patino as intersex -- she has an XY karyotype but a mutation that causes androgen insensitivity syndrome, so she appears completely female (though she has internal testes). She was thrown off the Spanish national team, and her prior medals and records were revoked. She contested the ruling, pointing out that her body was insensitive to the testosterone it produced, and the IAAF eventually reinstated her (though too late for her to compete at the Olympic level).

In the 80s and 90's, the IOC and IAAF started expressing more specific concerns, namely that high levels of testosterone (hyperandrogenism) in female athletes with differences/disorders of sexual development (DSDs) could provide an unfair advantage over other women by boosting power, endurance, and speed, and by driving morphological body and musculature changes.

In 2009 attention turned to Caster Semenya, a South African middle-distance runner who dominated the 800m at the 2009 African Junior Championships. Shortly thereafter, the IAAF tested her blood at the World Athletics Championships, and rumors arose that she had been sex-tested. Semenya, who had been unconcerned about the test because she assumed that she had been accused of doping, went into hiding. An IAAF spokesman announced that if she proved to be male she would be stripped of her medals but added *"However, if it's a natural thing, and the athlete has always thought she's a woman or been a woman, it's not exactly cheating"*. The IAAF general secretary was later quoted as saying *"She is a woman, but maybe not 100 percent."* Semenya filed a human rights complaint with the United Nations saying the testing had been *"both sexist and racist"*, and the IAAF cleared her to run again in 2010.

In 2011 the IAAF published a "hyperandrogenism policy" to replace their prior "gender verification" policy. This policy outlined a three-step process, including a physical examination looking for clinical signs of virilization, a blood test to examine hormone levels, and a chromosomal test. The policy prevented a female athlete from competing in track and field unless her testosterone was below 10nmol/L or she could prove that she had a condition that rendered her body's cells insensitive to androgen.

For reference, the "normal" range of estosterone in women is 0.3-2.4 nmol/L nd in men it is 9.2-31.8 nmol/L. A study f elite athletes demonstrated that about .4% of female athletes had "high" estosterone and 16% of male athletes had low" testosterone.



Dotplot of serum testosterone in male and female elite athletes. Reference ranges for nonelite athletes shown in shaded blocks. 16.5% of men had a serum testosterone below the lower limit of the male reference range (8.4 to 28.7 nmol/l) whereas 13.7% of women had a value above the upper limit of the female reference range (2.7 nmol/l). *N* = 446 men and 234 women. Each symbol represents up to 3 observations. *doi:10.1111/cen.12445*

In 2015 Dutee Chand, an Indian sprinter, was investigated and excluded from the Indian team based on even more restrictive regulations adopted by the Indian government. She filed a case with the Court of Arbitration of Sport (CAF). During the case, the IAAF testified that artificial doping with testosterone is forbidden, and that high endogenous testosterone is likely to have similar effects. However, they acknowledged that men's natural testosterone levels were unregulated no matter how high they got. Chand's witnesses pointed out that researchers have identified over 200 biological anomalies that offer competitive advantages to athletes in some contexts. The CAF suspended the rules and ordered the IAAF to complete research into the effects of testosterone levels on athletic competition.

In the 2016 Olympics, Chand competed in the women's 100 meters, but did not advance beyond the heats. In interviews, she has said "*I am unable to understand why I am asked to fix my body in a certain way simply for participation as a woman. I was born a woman, reared up as a woman, I identify as a woman and believe I should*

be allowed to compete with other women, many of whom are either taller than me or come from more privileged backgrounds, things that most certainly give them an edge over me."

In the 2016 Olympics Caster Semenya won the gold in the 800 meter and two competitors spoke out saying they thought she had competitive advantage.

In 2017 the IAAF published a study suggesting that high testosterone was associated with a competitive advantage in some events (the 400m, 400m hurdles, 800m, hammer, and pole vault) but not others. The IAAF subsequently published new rules, excluding women from competition in events that cover more than 400 meters if they had a specified DSD (listing mostly intersex conditions associated with XY karyotypes in people who are assigned female at birth, but also including congenital adrenal hyperplasia in 46 XX individuals) unless their testosterone levels were less than 5 nmol/L (either naturally or due to medical suppression). In the materials released at the time, the committee stated that these rules would not affect female athletes with polycystic ovary syndrome (which causes higher levels of androgens in circulation) because PCOS patients generally have an upper level of testosterone of 4.8 nmol/L.

Semenya challenged the new IAAF rules in court but lost in 2019. Joanna Harper, testifying on behalf of the IAAF, stated *"Fairness is an extremely subjective word, I prefer the word equitable... We separate male athletes and female athletes not on the basis of gender identity, or legal sex, or how people are identified at birth, but rather on biological characteristics that make men so much better at sport than women"*. Doriane Coleman at Duke Law School said in reference to the controversy that the IAAF rules create a "protected space" for women to compete: *"If eligibility for women's sports events can't be based on biological sex traits, or at least one biological sex trait, then you won't see females on the podium."*

At the 2020 Olympics, several athletes were withdrawn from their events due to hyperandrogensism and an XY karyotype [Christine Mboma (Namibia, 400m), Beatrice Masilingi (Namibia, 400m), Aminatou Seyni (Niger, 400m), Caster Semenya (South Africa, 800m), Margaret Wambui (Kenya, 800m), Francine Niyonsaba (Burundi, 800m)].

In 2023 the World Athletics Organization (formerly the IAAF) updated their eligibility rules to state that athletes with DSDs must reduce their testosterone levels to below 2.5 nmol/L for a minimum of 24 months to compete internationally in the female category in **any** female event (not just the events under prior restriction). The new rules specifically waive the testosterone suppression requirement for female athletes with a 46 XX karyotype and either congenital adrenal hyperplasia or PCOS, and for 46XY individuals with **complete** androgen insensitivity. They additionally agreed to exclude male to female transgender athletes who have been through male puberty from all female world ranking competitions.

Semenya has appealed to the European Court of Human Rights which in 2023 found that there had indeed been violations of her human rights, allowing her to continue to pursue her case, but not providing any mechanism for her to compete in the near future. World Athletics President Sebastian Coe stated "...we continue to take the view that we must maintain fairness for female athletes above all other considerations. We will be guided in this by the science around physical performance and male advantage which will inevitably develop over the coming years. As more evidence becomes available, we will review our position, but we believe the integrity of the female category in athletics is paramount."

Questions:

- What do you think is the aim[s] of sport/competition?
- The IAAF says they are trying to ensure a level playing field for female athletes. Do you think any of the IAAF's policy attempts get closest to this goal? Why or why not? Do you think the IAAF should be considering other values in how they draft this policy?
- What types of competitive advantages can an athlete enjoy (biological or not)?
- Are there ways in which sex-related genetic advantages are different from other competitive advantages?

Construct an argument either in favor or against sex testing female athletes in elite competition.

Sample short writing prompts:

Short Writing activity Expectations:
For each assignment, write a short (500-600 word) piece meant to be used to communicate in some public way about the topics we discuss throughout the module. Your work can take on one of the following forms (or you can be creative and come up with your own idea):

- newspaper op-ed
- blog post
- short story/scripted short skit
- a letter to the editor in response to a recent article
- a letter to a political representative or a script for a phone call to a political representative
- Communication appropriate for some online medium or social media platform (Reddit, TikTok, blog or Facebook post, etc.), that explains the philosophical or scientific nuances in a way that engages non-course participants.
- A pamphlet (that could be used for educational purposes or at a clinic)

We will provide prompts for each module, but you should feel free to be creative and do a write up that is sparked by any of the readings/activities in the module. Any issue that falls at an intersection between genetics and philosophy related to the topic of the module is acceptable. If you have questions about a particular topic, please feel free to email us in advance.

Writeups will be assessed based on:

Engagement and Accuracy:

- Does the write-up engage with both scientific and philosophical issues?
- Does the write-up accurately communicate the scientific issues at play?
- Does the write-up accurately communicate the philosophical issues at play?

Persuasiveness:

- Does the write up make a persuasive argument in favor of their stated position?
- Is the writing clear and succinct?
- Would the write up be compelling to a non-expert audience?

Creativity:

- Does the write-up present novel points that were not explicitly made in the readings?
- Is there some example, story, case that makes the scientific and philosophical issues salient to the audience?

Sample prompts for module "Behavioral Genetics and Moral Responsibility"

1. Imagine that you are on the defense team for Anthony Yepez (State v. Yepez) and you are trying to convince the New Mexico Supreme Court that the lower trial court judge was wrong to exclude behavioral genetic evidence from the trial. Write the opening remarks asking the NMSC to reverse the conviction for second-degree murder and to remand for a new trial given the importance of the excluded genetic evidence.
2. Governor Mike DeWine, along with health officials from across the state, announced a new campaign aiming to reduce the stigmas surrounding addiction and mental illness. Nearly $10

million was committed to the "Beat The Stigma" Links to an external site.campaign. It will include billboards, spots airing on television and outreach on digital platforms. For more information see: https://beatthestigma.org/about-addiction-mental-health-stigmas Links to an external site. One of the ideas that the campaign is promoting is the following quote: "The genes you're born with can increase your change of developing drug or alcohol addiction by 50%." Write or record a TikTok explainer or another social media post to explain what this statement does or does not mean. If you think that this statement can be misconstrued, articulate what you find the common misconception to be as part of your explainer.

Sample prompts for module "Genetics and Social Identities: Sex, Sexuality and Gender"

1. In 2018 and 2019 there were a number of popular press articles describing parents who had decided to attempt to raise their children (frequently referred to as "theybies" in news articles) in a "gender neutral" way. These parents generally use they/them pronouns when referring to their children and give the children androgynous names. They give the child full autonomy over their gender presentation, and answer "I don't know" to questions about the child's sex and gender. Imagine you are employed by a school district in Ohio and write a memo outlining what you think the district should do when one of these children enrolls in kindergarten and why.
2. "Gender reveal" parties have been an increasingly popular pregnancy milestone in some circles. Write (and record if desired) a TikTok script discussing the connections between the information available to pregnant couples (usually just sonogram images, though occasionally with additional information about karyotype) and the idea of revealing the gender of a fetus.

Sample prompts for module "Genetics and Social Identities: Race"

1. Actress Halle Berry and her ex-partner Gabriel Aubry have a daughter. Halle Berry has a white mother and Black father, and self-identifies as Black, while Gabriel Aubry is white and French Canadian. Berry was quoted in 2011 in an interview with Ebony magazine as saying with regards to her daughter *"I feel she's Black. I'm Black and I'm her mother, and I believe in the one-drop theory,"*. In contrast in his early golfing years, Tiger Woods got significant attention for correcting people who described him as the first Black Master's champion instead describing himself as Black/Asian or "Cablinasian" based on his background of being "one-fourth black, one-fourth Thai, one-fourth Chinese, one-eighth white and one-eighth American Indian." Write a TikTok video transcript [and record one if you wish] that uses these stances to frame a discussion on the relationships between ancestry and race.
2. In 2013, the National Football league entered into a settlement to provide financial support to retired players who develop symptoms of dementia that can be linked to chronic traumatic encephalopathy (CTE) as a result of head injuries during their playing careers. Eligibility for financial support requires ex-players to show a cognitive deficit that can be connected to their football career. More recently, it came to light that the NFL engaged in a process called "binary race norming" assuming that Black players start with worse cognitive function than whites and other non-Blacks. That made it harder for Black players to show a deficit and qualify for an award (and in fact at least two Black players were denied claims that would have succeeded if the players had been white). In June 2021, the NFL pledged to halt race norming in CTE screening. Write a Twitter thread intended to explain the genetic and philosophical aspects of this controversy to football fans.

Sample prompts for module "Genetic Selection and Enhancement"

1. A California company called Orchid Bioscience offers a service (https://www.orchidhealth.com/embryo Links to an external site.that will perform a polygenic risk score analysis that can be used as parents choose which IVF embryos to implant. The embryo that became a girl named Aurea (born in 2020) was selected for implantation after a similar screen designed to minimize her risks for heart disease, diabetes, and cancer. Imagine that a family member is considering doing such a screening after IVF. Write a letter to this individual explaining why you think they should or should not pursue this path.
2. When considering the morality of a possible technology, we can distinguish between questions/problems of principle and questions/problems of implementation. Implementation issues concern whether the technology would really be able to achieve the desired outcome, how it should be distributed, and the risks of other, unintended effects. Questions of principle concern whether the technology should be implemented at all, ignoring concerns related to possible implementation problems. Write an op/ed or blog post that addresses one or more **in principle** objections to using gene editing to enhance the expected cognitive abilities of an otherwise normal human embryo and argue against or in favor of the enhancement.

Class Closing Activity

Genetic determinism has been described as a belief that overestimates the causal effects of genotypes on resulting phenotypes. When genetic contributions to complex phenotypes like intelligence and behavior are overestimated, deterministic beliefs can contribute to societal problems including sexism and racism.

For instance, Dambrun et al (2009) (doi:10.1002/ejsp.498) recruited college students in their first and third year of college, with majors in psychology or biology.

The students took surveys measuring their position on the social dominance orientation (SDO) scale, which is intended to measure: ‘‘the degree to which individuals desire and support group-based hierarchy and the domination of ‘inferior’ groups by ‘superior’ groups’’. High scores on the SDO scale were positively correlated with prejudice towards Arabs, prejudice towards the poor and sexism as measured by additional questionnaires.

They also used surveys to measure student beliefs in "geneticism" which they viewed as a measure of belief in genetic determinism. Sample items on the survey include the degree to which people think that:

- peoples’ behavior is determined primarily by their genes
- in order to understand a person’s personality, it is very important to know their genetic code
- genes play a much more important role than the environment in the explanation of peoples’ behaviors.
- peoples’ personalities are shaped in a large part by their environments.

The study found that belief in the power of genetic forces was positively correlated with SDO, and with prejudice towards Arabs and the poor and sexism. In contrast, belief in the power of environmental forces was negatively correlated with SDO, and with prejudice towards Arabs and the poor and sexism.

Here are graphs showing the interaction between the students' major and year and their SDO score and interactions between the students' major and year and their belief in genetic determinism (the higher the bar, the higher the average student scores on that scale. In the figures below, we have added indicators of statistical significance to reflect the descriptions in the text. comparisons across years are shown above and comparisons between majors are shown below the X axis (so, for example, in Figure 1 the SDO scores for the two majors are not significantly different in the first year, but the SDO score for psychology majors drops significantly between years 1 and 3.)

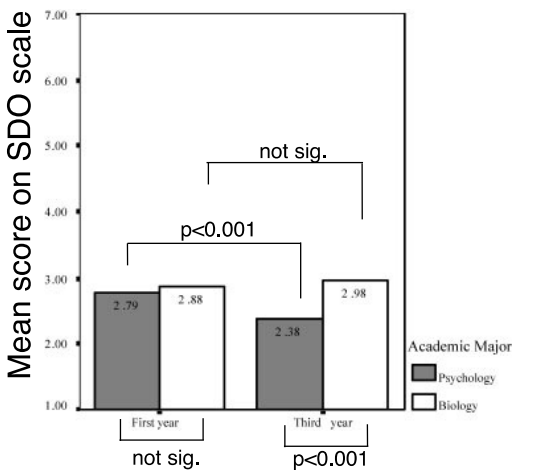


Figure 1: Significant interaction of academic major and academic year on **social dominance orientation.** Statistical significance indicators added by Dr. Cole to reflect data descriptions in the article text.

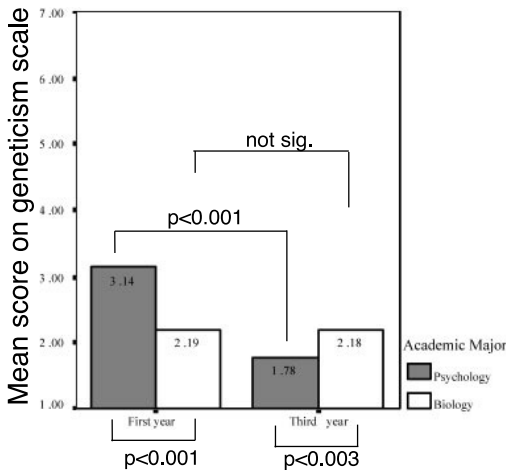


Figure 2. Significant interaction of academic major and academic year on **belief in genetic determinism.** Statistical significance indicators added by Dr. Cole to reflect data descriptions in the article text.

Question 1: How would you interpret the data in the two graphs and what concerns does it raise for you?

Question 2: These findings reflect correlations between SDO and belief in geneticism. Do you think there is also a causal relationship? If so, do you think genetic determinism can likely lead to SDO or SDO can likely lead to genetic determinism? Why or why not?

In another study, Gericke et al. (doi:10.1007/s11191-017-9950-y) used surveys to measure 1) belief in genetic determinism, 2) knowledge about the complexity of gene:environment interactions, and 3) knowledge about modern genetics and genomics. While they saw a positive correlation between 2 and 3 (ie people with better knowledge about gene:environment interactions tended to have better knowledge of modern genetics) they saw no correlation between either of the two knowledge scales and belief in genetic determinism.

Question 3: How would you relate the data from the Gericke study relate to the data in the graphs above?

Question 4: Given these data, our discussions in class and your personal experience, what concerns do you have about the ways in which we tend to teach genetic information at the K-12 or college level?

Question 5: Can you as a group propose interventions to improve understandings of genetic determinism and how might these interventions improve societal concerns. These could be things that could be done in individual classes or lessons or requirements that could be implemented at the major or even college level.

Originally approved, 3-credit hour syllabus

GENES AND SOCIETY
MOLGEN 2690, PHILOS 2690
Semester TBA, Lecture course, 3 credits
Time TBA
Place TBA

Instructors

Susan Cole
282 Biological Sciences Building phone: 614-292 3276
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Office hours: TBA

Justin D'Arms
314L University Hall phone: 614-292-7914
email: darms.1@osu.edu
Office hours: TBA

Course Description

This course will provide science-based exposure to topics in classical and modern genetics but with an emphasis on social and ethical issues. Together we will discuss what genes are, and how they work, and how your genome influences traits and behaviors. We will build on this scientific knowledge to explore the social, ethical and policy questions raised by our understandings (and misunderstandings) of genetic inheritance. The information available about genetics is increasing exponentially, but in many cases social, ethical and legal systems lag behind, influenced by ideas that are no longer valid. We will explore the roles of genetics in the context of social beliefs; genetic modifications of crops, animals and humans; the impacts of genetics on medicine; and the extent to which genetics influence critical social constructions like race, sex, and sexuality. Completion of the course will help you understand that science is not separate from your life; but informs many aspects of our society.

Learning Outcomes

Upon completion of this course students will:

- Acquire and apply basic foundational knowledge in genetics
- Acquire and apply basic knowledge of ethics and the theory of value
- Learn terms, theories, and applications of genetic technologies and apply them to social, legal and ethical issues.
- Use information and ideas from the class to assess the social, legal and ethical implications of a genetic principle/technology.
- Understand and describe ethical considerations arising from genetics from multiple viewpoints, using information from diverse disciplines to formulate ethical decisions.
- Use critical and logical thinking to analyze the relationships between science and technology and contemporary social issues.
- Engage in critical and logical thinking and critical analysis
- Devise informed and meaningful responses to problems and arguments based on the interpretation of appropriate evidence
- Formulate considered and reasoned ethical decisions concerning issues related to genetics
- Better understand the need for integration across disparate disciplines when considering societally important topics

Readings

Readings will be taken from a variety of sources including open source textbooks and accessible journal articles and will be available online via carmen. You can expect to read two to four articles or chapters each week of the course.

Course website

https://carmen.osu.edu Some notes and supplemental materials will be available on this website. Note packets including major figures used during lectures will be posted prior to lectures. You are encouraged to print these out and bring them to class or access them as PDFs on an eReader. Required readings will be posted or linked prior to class. You are encouraged to print these out and bring them to class or access them as PDFs on an eReader.

Attendance

Attendance and active participation is expected at all class meetings. If you miss a class meeting, you should get notes from a classmate, read the relevant materials, and then you may make an appointment with the instructor to go over any material you need assistance with.

Grading information

Class participation: Students are expected to contribute actively to in class discussions. Participation will be assessed on both quantity and quality of your input. Class participation will account for 5 % of your final grade.

Informal in class activities: We will have occasional in class activities that require your participation either as an individual or part of a group. You should come to every class prepared with paper and writing implements in order to take part in these activities. Materials related to these activities will be turned in at the end of class. Because they rely on active and timely participation, in class can not be made up. However, your lowest two grades on in class activities will be dropped to allow for unexpected emergencies. These activities will account for 10% of your grade.

Reading responses: For some readings you will be asked to provide a short written response to a reading prompt. 10 responses will be required over the course of the class, graded for completion. Reading responses will account for 10% of your final grade.

Exams: There will be one midterm and one (noncumulative) final exam, each worth 25% of your grade

Final Paper: You will write a four page paper engaging with the ethical implications of one of the issues we have covered. This paper will be worth 25% of your grade

Grading:

Final grades will be based on your final percentage [(points accumulated/ total points for the course) x 100)].

Guaranteed grading scale: 93-100 = A; 90-92 = A-; 87-89 = B+; 83-86 = B; 80-82 = B-; 77-79 = C+; 73-76 = C; 70-72 = C-; 67-69 = D+; 63-66 = D; 60-62 = D-; 0-59 = F

The instructors reserve the right to adjust the lower limits for each grade category downwards if justified by overall class performance (i.e., a 90 % is guaranteed to receive an A-, but in some cases an A- may be assigned for a performance below 90%).

Statement on Academic Misconduct

"It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct http://studentlife.osu.edu/csc/."

The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's Code of Student Conduct. Ignorance of the University's Code of Student Conduct is never considered an "excuse" for academic misconduct. Suspected cases of academic misconduct will be reported to the Committee on Academic Misconduct. If COAM determines that you have violated the University's Code of Student Conduct, the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact the instructors

Student Accommodations

"Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 098 Baker Hall, 113 W 12th Ave; 614-292-3307 Office / 614-429-1334 VRS / 614-292-4190 Fax Web: slds.osu.edu."

TENTATIVE SCHEDULE

WEEK	FOCUS
1-2	Overview of transmission genetics and molecular genetics Overview of philosophical ethics and theory of value Overview of the idea of "Human Nature" and its significance in ethical thought READINGS: 1) Chapters 11 and 12 of Biology 2e available through OpenStax 2) Plato, selections from Republic 3) Shafer Landau, Fundamentals of Ethics, Introduction
3-4	Gene:phenotype correlations • Types of mutations and what they can do mechanistically • "Single" gene traits vs multigenic traits • Issues with penetrance and expressivity • Gene environment interactions Philosophical issues concerning responsibility and determinism • What is responsibility? • Is it compatible with determinism? • How might different understandings of genetic influence on behavior bear on responsibility? READINGS: 1) Chapter 13 of Biology 2e available through OpenStax 2) "Mutations and Health" Genetics Home Reference at National Library of Medicine (https://ghr.nlm.nih.gov/primer#mutationsanddisorders) 3) Harry Frankfurt, "Freedom of the Will and the Concept of a Person" 4) Robert Kane, "Reflections on Free Will, Determinism and Indeterminism"
5-6	Genetics of sex determination/ gender/ sexuality • How do you define "sex" • Phenotypic expression of "sex" • How does genotype influences gender and/or sexuality • Biological, Social, and normative conceptions of sex and gender READINGS: 1) Hake, L. & O'Connor, C. (2008) Genetic mechanisms of sex determination. Nature Education 1(1):25 2) Beyond XX and XY Amanda Montañez Scientific American 317, 50-51 3) When Sex and Gender Collide Kristina R. Olson Scientific American 317, 4449 4, Sally Haslanger, "Gender and Race: (What) Are They, (What) Do We Want Them to Be"

MIDTERM 1 will be held on Monday of Week 7

7-8	Genetic modification and gene editing • Modification of crops and domestic animals • Potential modification of humans • Ethical challenges to gene modification: consequentialist and other READINGS: 1) Safety of Genetically Engineered Foods: Approaches to Assessing Unintended Health Effects. Chapter 2 (Methods and Mechanisms for Genetic Manipulation of Plants, Animals, and Microorganisms) Available online at https://www.ncbi.nlm.nih.gov/books/NBK215771/ 2) The Gene Genie Knox, Margaret Scientific American, 311, 42-46 3) Leon Kass, Preventing Brave New World 4) Michael Sandel, The Case Against Perfection
9-10	Genetics and Altruism • How could altruism evolve • idea of the "selfish gene" • ideas of genetic and psychological altruism, and the value of altruism READINGS: 1) Chapter 4 of Biofundamentals available through OpenStax 2) Excerpt on Kin Selection from The Selfish Gene by Richard Dawkins 3) Sober and Wilson, Altruism, selections.
11	Genetics in medicine • Genetic disorders vs disorders with a genetic component • Genetic testing • Personalized medicine • How do we decide what traits can be selected for or against? READINGS: 1) FAQs from the NIH about genetic testing (https://www.genome.gov/19516567/faq-about-genetic-testing/) and pharmacogenomics (https://www.genome.gov/27530645/faq-aboutpharmacogenomics/) 2) "Genetic Testing" Genetics Home Reference at National Library of Medicine (https://ghr.nlm.nih.gov/primer#testing) 3) William Shaw, Consequentialism

12	Genes in the marketplace • Gene patents • Buying genetic enhancement • Should the market for genes and their alterations be completely open? READINGS: 1) NIH Genome Research Institute "Intellectual Property" (https://www.genome.gov/19016590/intellectual-property/) 2) Peter Singer, Parental Choice and Human Improvement 3) Elizabeth Anderson: Why Some Things Should Not Be For Sale: The Moral Limits of Markets
13	Genes and privacy • Who can access your genetic information and why? • Should genetic information be freely shared? • What is the value of privacy, and are there special concerns regarding genetic privacy? READINGS: 1) NIH Genome Research Institute "Privacy in Genomics" (https://www.genome.gov/27561246/privacy-in-genomics/) 2) Jeffrey Johnson, The Nature and Value of Privacy
14	Epigenetics • Idea of heritable changes that don't alter DNA structure • Environmental influences that span generations • How does epigenetics change our view of the influence of genes? READINGS: 1) Skinner, Michael "The Case for Inheritance of Epigenetic Changes in Chromosomes" Scientific American 2014 311: 44–51.

Final Exam:
The second exam will be held on the final exam date scheduled by the registrar. Do NOT make travel plans that conflict with the scheduled exam date, as NO alternative dates will be permitted.

GENES AND SOCIETY
MOLGEN 2690, PHILOS 2690
Spring Semester, Lecture course, 4 credits
Tuesday/Thursday 9:35-10:55
Derby Hall Room 029

Instructors

MolGen Instructor
Office
phone: xxx
email: xxx
Office hours: xxx

Philosophy instructor
Office
phone: xxx
email: xxx
Office hours: xxx

Course Description

How much of who you are is related to the genetic sequences that you inherited from your parents? Does it matter? The field of genetics was born in the early 1900s when Gregor Mendel defined inheritance patterns in peas. An explosion of research over the next century suggested that changes in DNA sequences affect traits and behaviors in all organisms. The completion of the human genome sequence in 2003 represented the height of genetic optimism, suggesting that if we knew gene sequences we could revolutionize science and medicine. However, our understandings (and misunderstandings) of genetic inheritance have had enormous societal impacts that must be discussed and understood by a broad population of scientists and citizens. We will discuss the science behind, and philosophy underlying issues like the genetic modifications of crops, animals and humans; the impacts of genetics on medicine; and the extent to which genetics influence critical social constructions like race, sex, and sexuality. This class will teach philosophers and ethicists some science, and teach scientists some ethical and philosophical framework so we can engage in robust discussions of the intersections of genetics and society.

Class Learning Outcomes

Upon completion of this course students will:

- Acquire and apply basic foundational knowledge in genetics
- Acquire and apply basic knowledge of ethics and the theory of value
- Learn terms, theories, and applications of genetic technologies and apply them to social, legal and ethical issues.
- Use information and ideas from the class to assess the social, legal and ethical implications of a genetic principle/technology.
- Understand and describe ethical considerations arising from genetics from multiple viewpoints, using information from diverse disciplines to formulate ethical decisions.
- Use critical and logical thinking to analyze the relationships between science and technology and contemporary social issues.
- Engage in critical and logical thinking and critical analysis
- Devise informed and meaningful responses to problems and arguments based on the interpretation of appropriate evidence
- Formulate considered and reasoned ethical decisions concerning issues related to genetics
- Better understand the need for integration across disparate disciplines when considering societally important topics

General Education Goals and Expected Learning Outcomes

In addition to the learning goals listed above, this course fulfills the expected learning goals for the GEN Theme in Traditions, Cultures, and Transformations.

GEN Rationale:
Taught across two interdisciplinary departments—Molecular Genetics and Philosophy—this course engages with notions of traditions and transformations in cultures and social institutions by exploring the intersections of genetics and philosophy and explicitly interrogating how our understandings of genetics inform ongoing societal discussions around the rapid changes resulting from new genetic understandings and technologies. We discuss how new genetic technologies like genetic engineering are transforming our society, and how new understandings of the genetic contributions to categories like race, sex, sexuality, gender, disability, personality, and behavior are contributing to ongoing societal discussions.

Completion of the Theme goals and learning outcomes listed below will be supported by the following activities, which are directly connected to GE and Themes specific goals below:

- Class readings and activities that will provide you and your peers with opportunities to report on what you have learned and to apply this new knowledge to other questions raised inside and outside of the class.
- Short writing assignments that provide opportunities to explain and contextualize your new knowledge and lived experiences for audiences outside the classroom.
- Completion of a central project will offer you and opportunity to complete an in depth and scholarly exploration of some topic of your interest at the intersection of genetics and society.

GEN GOAL 1. Successful students will analyze an important topic or idea at a more advanced and in-depth level than in the Foundations component.

Expected Learning Outcome 1.1. Engage in critical and logical thinking about the topic or idea of the theme.

This course will build skills needed to engage in critical thinking about the intersections of genetics and philosophy as they relate to the theme at an advanced level through:

- Foundational readings/lectures that provide you with critical tools needed to engage in logical thinking surrounding the intersection of genetics and philosophy and to apply this to ongoing discussions around cultural transformations.
- Weekly reading responses which require you to synthesize and critically evaluate cutting-edge scholarship on the science of genetics as well as foundational and current philosophical considerations in these areas.
- In-class discussion and debates on the science of genetics, and intersections between sciences and philosophy in current society. Module closing activities center around a case that integrates current genetic science with philosophical and ethical discussions. You will work with your peers to critically evaluate and contextualize the case, and to provide policy or other recommendations .

Expected Learning Outcome 1.2 Engage in advanced, in-depth, scholarly exploration of the topic or idea of the theme.

You will engage in independent scholarly applications at the intersections of genetics and philosophy and their roles in cultural transformations by:

- Module closing short writing assignments where you complete a short writing piece that is intended to communicate in some public way about the topics we discuss throughout

the module, incorporating at least two scholarly sources in you work.
- Completion of a major, project that explores a topic of interest to you at the intersections of genetics and philosophy, culminating in a scholarly final paper. You will receive feedback at several points in the semster including a topic brainstorming day, a poster presentation, and rough draft evaluations prior to submission of the final paper.

GEN GOAL 2. Successful students will integrate approaches to the theme by making connections to out-of-classroom experiences with academic knowledge or across disciplines and/or to work they have done in previous classes and that they anticipate doing in future.

Expected Learning Outcome 2.1. Identify, describe, and synthesize approaches or experiences as they apply to the theme.

- You will engage in advanced exploration of theme topics through a combination of readings, interactive lectures and discussions.
- During module-closing activities you will apply your knowledge from this and prior coursework as well as your lived experiences to cases related to theme topics.
- Short writing assignments and major scaffolded project provide major opportunities for you to identify, describe, and synthesize experiences related to the theme topics.

Expected Learning Outcome 2.2. Demonstrate a developing sense of self as a learner through reflection, self-assessment, and creative work, building on prior experiences to respond to new and challenging contexts.

- In short writing assignments you write pieces intended for a public audience. By integrating genetics and philosophy at a level appropriate for that audience, you will incorporate new knowledge and your prior experiences in a creative way.
- For the final project you select any topic of interest that bridges genetics and philosophy and complete self-directed, scaffolded research and analysis to complete a paper that puts forward and defends a stance regarding a complex topic, requiring you to synthesize and expand your knowledge of topics related to the class.
- Throughout the semester, you will receive feedback from peers and from the instructors related to their final project. Your own short reflections will help you plan how best to incorporate this feedback into your final assignment.
- A closing class discussion explicitly asks you to work with peers to reflect on your experiences in this and other classes, connect these experiences to wider questions of how we teach genetics and philosophy, and provide suggestions to better help others understand the intersection of these two fields.

GEN GOAL 3. Successful students will engage in a systematic assessment of how cultures and sub-cultures develop and interact, historically or in contemporary society.

Expected Learning Outcome 3.1. Describe the influence of an aspect of culture (e.g., religious belief, gender roles, institutional organization, technology, epistemology, philosophy, scientific discovery, etc.) on at least one historical or contemporary issue.

Numerous modules in the course draw connections between aspects of culture and contemporary issues. Readings and in class discussions provide you with the knowledge to describe the influence of aspects of culture on contemporary issues, and module closing activities and short writing assignments provide opportunities for you to cement these understandings. For example:

- “Behavioral genetics and moral responsibility”: You will complete readings that highlight the current state of knowledge around the influence of genetic variation on personality and behavior as well as philosophical theories of moral responsibility. In

discussion and module closing activities, you will make explicit connections between these understandings and the impact of genetics in the legal system.

- "Genetics and Philosophy of Social Identities: Sex, Sexuality, and Gender": You will complete readings that highlight the current state of knowledge around the influence of genetic variation on sexual and development and gender identity as well as philosophical theories of gender in society. In discussion and module closing activities, you will make explicit connections between these understandings and current discussions surrounding rapid changes in view of gender in contemporary society.

Expected Learning Outcome 3.2. Analyze the impact of a "big" idea or technological advancement in creating a major and long-lasting change in a specific culture.

Numerous modules in the course examine the impact of rapidly changing genetic technologies on our contemporary society. Readings and in class discussions provide you with the knowledge to understand the impacts of technological advancements on society as well as the ethical considerations involved in technological and biomedical research. Module closing activities and short writing assignments provide opportunities for you to cement these understandings. For example:

- "Genetic Selection and Enhancement": You will complete readings that highlight the current state of technology related to genetic screening and engineering as well as philosophical theories related to parental responsibilities. In discussion and module closing activities, you will make explicit connections between the rapidly evolving opportunities to select for or create specific genetic changes and the impacts on our changing culture.

Expected Learning Outcome 3.3. Examine the interactions among dominant and sub-cultures.

- Several relevant modules examine the interactions between dominant and subcultures, interrogating the effects our understandings of genetics have on these discussions and interactions. Readings and in class discussions provide you with the knowledge to understand how genetic variation affects (or does not) these cultural groups, and how deeper understanding of the science of genetics can upend dominant conceptions of social identity – such as race and gender. Module closing activities and short writing assignments provide opportunities for you to cement these understandings. Critical modules related to this goal include: "Genetics and Philosophy of Social Identities: Race", and "Genetics and Philosophy of Social Identities: Sex, sexuality, and gender". Discussions in the module "Genetic Selection and Enhancement" also interrogate issues surrounding disability.

Expected Learning Outcome 3.4. Explore changes and continuities over time within a culture or society.

- Several modules provide historical context in readings and discussions to help you contextualize changes and continuities of these discussions in our society. Readings and in class discussions provide you with the knowledge to synthesize and contextualize how our changing understanding of genetics informs changes in social discussions at the intersections of genetics and philosophy, and their effects on cultural transformations. Module closing activities and short writing assignments provide opportunities for you to cement these understandings. Critical modules related to this goal include explicit discussions regarding eugenics in the foundational lectures and in the module "Genetic Selection and Enhancement"; and explicit discussions of the changing understandings of race, sex, and gender in the modules "Genetics and Philosophy of Social Identities: Race", and "Genetics and Philosophy of Social Identities: Sex, sexuality, and gender".

GEN GOAL 4. Successful students will engage in a systematic assessment of differences among societies, institutions, and individuals' experience within traditions and cultures.

Expected Learning Outcome 4.1. Recognize and explain differences, similarities, and disparities among institutions, organizations, cultures, societies, and/or individuals.

- Through explicit discussion of whether and how genetic variation contribute to health ("Behavioral genetics and moral responsibility", "Genetic selection and engineering") and social identities ("Genetics and Philosophy of Social Identities: Race", and "Genetics and Philosophy of Social Identities: Sex, sexuality, and gender") you have opportunities to recognize and describe these similarities and differences, and contextualize how they contribute to disparate outcomes in our society. Readings and in class discussions provide foundational and advanced information on these topics, while module closing activities and short writing assignments provide opportunities to contextualize and synthesize this knowledge, explaining its relevance in ongoing societal discussions

Expected Learning Outcome 4.2. Explain ways in which categories such as race, ethnicity, and gender and perceptions of difference impact individual outcomes and broader societal issues.

- These topics are most explicitly addressed in the modules surrounding the Genetics and Philosophy of Social Identities. Through lectures and readings, you will be introduced to current and cutting edge research in how genetic variation does and does not influence these social identities, an receive grounding in philosophical theories about the nature of these categories in our current society. Throughout the semester, you will also engage with readings and cases related to inclusive practices of genetic research and challenges to generalizability, applicability and representativeness of genetics research to the target populations. Module closing activities and short writing assignments give you the opportunity to contextualize and expand their understandings and make connections to broader societal issues.

Course website: https://carmen.osu.edu Some notes and supplemental materials will be available on this website, as will all required readings. Carmen will also be used to submit reading responses and other assignments.

Course communication: Announcements through carmen are the main communication pathway from the instructors. We urge you to adjust carmen settings (https://community.canvaslms.com/docs/DOC-10624) so you are alerted to new announcements. The best way to communicate with us is via email either through carmen or from your buckeyemail.osu.edu email. Please be aware that emails from addresses other than buckeyemail.osu.edu email may be missed or may be sent to our junk or spam folder by the OSU email system. Please include the class number and name in the title of your email.

Workload expectations: This course is a 4-credit hour class. Credit hour definitions anticipate that students will spend at least 3 hours per week on work associated with a class for each credit hour earned (counting time in and out of class). This class meets twice a week for 80 minutes/meeting, but we anticipate that students will need to devote additional time to the course outside of class meetings, leading to a commitment of at least 12 hours per week. Due to the interdisciplinary nature of the class, we anticipate that most students will need to devote additional time to readings and reading responses, especially when these are outside of their own area of expertise. Multiple writing assignments and a major, ongoing project will also require additional effort throughout the semester for successful students. These expectations are outlined in more detail below.

Readings: Readings will be taken from a variety of sources including open-source textbooks and accessible journal articles and will be available online via carmen. You can expect to read four to six articles or chapters each week of the course. Required readings will be posted or linked on carmen prior to class. You are also expected to bring a (physical or .pdf) copy of the material with you to class. The best choices are a paper copy or a copy on an iPad/tablet in a format that you can annotate. Trying to read a pdf on your phone is no substitute for a copy with which you can actually work.

Attendance: Attendance and active participation are expected at all class meetings. If you miss a class meeting, you should get notes from a classmate, read the relevant materials, and then you may make an appointment with the instructor to go over any material you need assistance with. You must be in attendance to earn participation points.

Should in-person classes be canceled, we will notify you as to which alternative methods of teaching will be offered to ensure continuity of instruction for this class. Communication will be via CarmenCanvas.

If you are isolating while waiting for a COVID-19 test result, please let me know immediately. Those testing positive for COVID-19 should refer to the Safe and Healthy Buckeyes site for resources. Beyond five days of the required COVID-19 isolation period, we may rely on Student Life Disability Services to establish further reasonable accommodations. You can connect with them at slds@osu.edu; 614-292-3307; or slds.osu.edu.

The two dropped participation grades are intended to allow for brief illnesses or unexpected emergencies without impact to your grade. Please contact us to discuss any longer-term issues that might affect your attendance and participation.

Religious accommodations for attendance:

Ohio State has had a longstanding practice of making reasonable academic accommodations for students' religious beliefs and practices in accordance with applicable law. In 2023, Ohio State updated its practice to align with new state legislation. Under this new provision, students must be in early communication with their instructors regarding any known accommodation requests for religious beliefs and practices, providing notice of specific dates for which they request alternative accommodations within 14 days after the first instructional day of the course. Instructors in turn shall not question the sincerity of a student's religious or spiritual belief system in reviewing such requests and shall keep requests for accommodations confidential.

With sufficient notice, instructors will provide students with reasonable alternative accommodations with regard to examinations and other academic requirements with respect to students' sincerely held religious beliefs and practices by allowing up to three absences each semester for the student to attend or participate in religious activities. Examples of religious accommodations can include, but are not limited to, rescheduling an exam, altering the time of a student's presentation, allowing make-up assignments to substitute for missed class work, or flexibility in due dates or research responsibilities. If concerns arise about a requested accommodation, instructors are to consult their tenure initiating unit head for assistance.

A student's request for time off shall be provided if the student's sincerely held religious belief or practice severely affects the student's ability to take an exam or meet an academic requirement and the student has notified their instructor, in writing during the first 14 days after the course begins, of the date of each absence. Although students are required to provide notice within the first 14 days after a course begins, instructors are strongly encouraged to work with the student to provide a reasonable accommodation if a request is made outside the notice period. A student may not be penalized for an absence approved under this policy.

If students have questions or disputes related to academic accommodations, they should contact their course instructor, and then their department or college office. For questions or to report discrimination or harassment based on religion, individuals should contact the Office of Institutional Equity.

Policy: Religious Holidays, Holy Days and Observances

Statement on Academic Misconduct

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the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact us.

Please take care of yourself! As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life's Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling 614-292-5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on call counselor when CCS is closed at 614-292-5766 and 24 hour emergency help is also available 24/7 by dialing 988 to reach the Suicide and Crisis Lifeline.

Student Accommodations

The university strives to maintain a healthy and accessible environment to support student learning in and out of the classroom. If you anticipate or experience academic barriers based on your disability (including mental health, chronic, or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion.

If you are isolating while waiting for a COVID-19 test result, please let me know immediately. Those testing positive for COVID-19 should refer to the Safe and Healthy Buckeyes site for resources. Beyond five days of the required COVID-19 isolation period, I may rely on Student Life Disability Services to establish further reasonable accommodations. You can connect with them at slds@osu.edu; 614-292-3307; or slds.osu.edu.

Grading information

ASSIGNMENT CATEGORY	PERCENT
Class participation	15
Reading responses	20
Public Philosophy/Public Science Communication Exercises	24
Genes and Society Project Milestones	9
Genes and Society Project Poster	10
Genes and Society Project Final Paper	22
Total	100

1) Class participation: 15% of final grade

Students are expected to contribute actively to in-class discussions and activities. Participation is assessed on the quantity and quality of your input. Occasional informal in-class activities require your participation, either as an individual or as part of a group. In addition, most modules close with a wrap-up activity at which attendance and engagement is required. You should come to every class prepared with paper and writing implements to take part in these activities. You are also expected to bring a (physical or .pdf) copy of the reading material with you to class. Trying to read a pdf on your phone is no substitute for a copy with which you can actually work. Class participation depends on active and timely participation, so participation points cannot be made up. Your lowest two grades in this category will be dropped to allow for emergencies/illnesses/interviews etc.

2) Reading responses: 20% of final grade

For most readings you will be asked to provide short written responses to a reading prompt (posted within the relevant assignment). These activities will help you understand and engage with the materials, and will prepare you for active participation in class discussions and activities.

- Responses are generally anticipated to require a single, well-constructed paragraph for each question asked. These responses should insightfully engage with the reading and be free from philosophical or scientific errors
- Reading responses are graded as satisfactory/unsatisfactory
- You are permitted to rewrite two responses that earn a grade of unsatisfactory before the end of module 2 (ie the Feb 6th assignment is the last one you can rewrite). This is intended to give you a chance to get used to our expectations for these assignments, so this only applies to responses that were submitted on time and earned an unsatisfactory grade. Rewrites must be submitted within one week from the date on which the grade was assigned.
- One reading response grade will be dropped. Our current syllabus calls for 19 reading responses, thus each response is worth a bit more than 1% of your grade.
- These responses contribute to Expected Learning Outcome 1.1

3) Public Philosophy/Public Science Communication Exercises: Two throughout the semester each worth 12% of final grade (link to expectations)

Throughout the semester, you will be honing your skills of critical analysis, persuasive argument, and clear scientific writing. In light of this, you will have two opportunities to engage in a bit of public philosophy or public scientific communication. At the end of each module, you will be presented with some prompts that will invite you to write a short (500-600 word) piece meant to be used in some public way about the topics we discuss in each module. This can take various forms, such as a newspaper op-ed, a letter to the editor in response to a recent article, a letter to one of your political representatives, a script for a call to your representative, a Facebook post, or a blog post. More information about these assignments will be provided as the due date approaches. You must complete two of these short write ups over the course of the semester and at least one of the write ups should be completed prior to Spring Break. Each Public Philosophy/Public Science

Communication write up must be turned in within 7 days of the module's wrap-up activity.

- These assignments contribute to Expected Learning Outcome 3.1.; 3.2.; 3.3. and 3.4

4) Genes and Society project 41% (link to project expectations)

Over the course of the semester, you will develop a long-term project in some area at the intersection of Genetics and Philosophy. Detailed expectations will be posted separately on carmen, but the overarching goal of the assignment is for you to do some independent critical thinking and argumentation about genetics deploying the analytical tools you have been learning and using in class. The best projects will identify and explain some ethical or philosophical issues that arise in connection with the topic, adopt a clear position with respect to these issues, and argue in favor of your position. During the semester you will engage with this project in several ways, culminating in a paper that will be due **April 25th**. This project will be scaffolded to support your engagement and to provide feedback along the way. Periodic benchmarks will contribute to your final grade.

- Topic development: You are not limited to topics we discuss in class (in fact the best projects may engage with new topics), but we can help you refine and focus your topic. We urge you to start thinking about this early and start engaging in discussions with us by mid February. The brainstorming session on **Thursday February 22nd** is an opportunity to fine-tune your topic submission and is worth 1% of your grade
- Topics must be submitted for approval by the instructors by **Friday March 1st**, and timely approval is worth 1% of your grade.
- In late March/early April **(3/28 or 4/2)** you will present a poster (link to additional poster expectations)based on your topic. We will commit two days to poster presentations, and you will present your poster one day and review two peer posters the other day, providing written feedback on the posters you review
    - Your poster is worth 10% of your final grade based on review by the instructors. A copy of your poster and a link to 5-10 minute video of your poster presentation must be uploaded to carmen by 11:59 PM on **Monday March 25th.**
    - Your peer feedback to your colleagues is due the day after the poster session and is worth 2% of your grade (1% for each review)
    - You will write a brief document describing your plan for incorporating feedback from your peers and the instructors due **Monday April 8th** and worth 2% of your grade
- A rough draft of your paper is due **on Wednesday April 17th**. Submission of a draft that is adequate for peer review is worth 1% of your grade.
- On **Thursday April 18th** we will hold an in-class session where you will work in small groups to review colleague's papers. Engagement in the peer review session is worth 2% of your grade.
- The final paper is worth 22% of your grade and is due **Thursday April 25th by 11:59 pm**
- This project contributes to Expected Learning Outcome 1.2; 2.1; 2.2

PROJECT OVERVIEW:

Topic pitch (Brainstorming day): Feb 22nd (1% of final grade)
Topic approval March 1st (1% of final grade)
Poster/video upload March 25th (10% of final grade)
Poster peer feedback Thursday, 4/4(1% for each feedback)
Feedback response April 8th (2% of final grade)
Rough draft due April 17th (1% of final grade)
Peer evaluation In class April 18th (2% of final grade)
Final paper April 25th (22% of final grade)

Grading scale

Generally, the final grades assigned will reflect the OSU Standard grade scheme, however, the instructors reserve the right to adjust the lower limits for each grade category downwards if justified by overall class performance (i.e., a 90 % is guaranteed to receive an A-, but in some cases an A- may be assigned for a performance below 90%).

A	100% to 93%
A-	< 93% to 90%
B+	< 90% to 87%
B	< 87% to 83%
B-	< 83% to 80%
C+	< 80% to 77%
C	< 77% to 73%
C-	< 73% to 70%
D+	< 70% to 67%
D	< 67% to 60%
E	< 60% to 0%

TENTATIVE SCHEDULE (NOTE: for convenience, this schedule uses dates from SP24)

DATE	Title	Readings	
Tues 1/9	Introduction	none	

Foundations			**ELOs**
Thur 1/11	Foundations of Ethics	1) Shafer-Landau, The Fundamentals of Ethics, Introduction pp 1-9; 2) "The Challenge of Cultural Relativism," James Rachels	1.1; 2.1; 4.1
Tues 1/16	Historical context, genetic basis, definitions of heritability	1) Carey, *Human Genetics for the Social Sciences* "History of Genetics" 2) Online packet for Jan 16	1.1; 1.2 ; and 2.1
Thur 1/18	Foundations of critical thinking	1) James Pryor, "What is an Argument" http://www.jimpryor.net/teaching/vocab/argument.html 2) James Pryor, "Vocabulary describing Arguments" http://www.jimpryor.net/teaching/vocab/validity.html 3) Shafer-Landau *The Fundamentals of Ethics*, Introduction pp 9-17	1.1 and 2.1
Tues 1/23	Analysis of genetic variability and inheritance	1) Online packet for Jan 23 2) "The Heritability Fallacy" Moore et al. 2107	1.1; 1.2 ; and 2.1
Thur 1/25	Moral Theories: Utilitarianism and Deontology	Shafer-Landau, The Fundamentals of Ethics, Chapters 9, 11&12	1.1 and 2.1; 4.1

Behavioral genetics and moral responsibility			
Tues 1/30	Determinism and Moral Responsibility	1) G. Strawson, "The Impossibility of Moral Responsibility;" 2) Stanford Encyclopedia of Philosophy "Moral Responsibility" Intro and Sections 1 and 2. https://plato.stanford.edu/entries/moral-responsibility/	1.1; 1.2; 2.1; 3.1; 3.2
Thur 2/1	Behavioral Genetics	1) Breed and Sanchez 2010 "Both Environment and Genetic Makeup Influence Behavior" from scitable.com https://www.nature.com/scitable/knowledge/library/both-environment-and-genetic-makeup-influence-behavior-13907840/ 2) Greenspan 2008 "The origins of behavioral genetics"	1.1; 1.2; 2.1; 3.1; 3.2
Tues 2/6	Genetics, behavior, and moral responsibility	Ebstein et al "Genetics of Human Social Behavior" *Neuron* 2010	1.1; 1.2; 2.1; 3.1; 3.2
Thur 2/8	in class wrap up	No reading (group activity/discussion)	2.2; 3.2

Genetics and Social Identities: Sex, sexuality and gender			ELOs
Tues 2/13	Genetic influences on sex, sexuality and gender development	1) Online packet on sex determination 2) Sidhartha Mukherjee 2016 " Why Sex Is Mostly Binary but Gender Is a Spectrum" from https://nautil.us/issue/43/heroes/why-sex-is-binary-but-gender-is-a-spectrum 3) Roselli 2017 "Neurobiology of gender identity and sexual orientation"	1.1; 1.2;4.1; 4.2
Thur 2/15	Philosophical issues around sex, sexuality and gender	1) Fausto-Sterling, Anne. (2018) "Why Sex Is Not Binary." *Opinion*. the New York Times. 25 Oct. 2018. **https://www.nytimes.com/2018/10/25/opinion/sex-biology-binary.html** 2) Haslanger, S., 2000, "Gender and Race: (What) Are They? (What) Do We Want Them to Be?," *Noûs* 34, 31–55. **Supplemental Further Reading for those interested:** Fausto-Sterling, Anne. (2020) "Science Won't Settle Trans Rights." *Opinion.* Boston Review. 12 Feb. 2020.	1.1; 1.2;4.1; 4.2
Tues 2/20	in class wrap up (group activity/discussion)	Preread: Padawar. R "The Humiliating Practice of Sex-Testing Female Athletes" New York Times, June 28, 2016 **Supplemental Reading for those interested:** 1. Foddy B, Savulescu J. Time to re-evaluate gender segregation in athletics? Br J Sports Med. 2011 Dec;45(15):1184-8. doi: 10.1136/bjsm.2010.071639. Epub 2010 Aug 10. PMID: 20702382. 2. Bostwick JM, Joyner MJ. The limits of acceptable biological variation in elite athletes: should sex ambiguity be treated differently from other advantageous genetic traits?. Mayo Clin Proc. 2012;87(6):508-513. doi:10.1016/j.mayocp.2012.04.002	1.1; 1.2;4.1; 4.2

Thursday 2/22: Brainstorming day:	
In class activities and input input from Professors Cole and Howard about your topic selection (which is due Friday March 1)	1.2; 2.2

Genetics and Social Identities: Race			ELOs
Tues 2/27	The genetics of ancestry and race	1) Skin Deep: What is race, exactly? National Geographic (Vol. 233, Issue 4) Elizabeth Kolbert 2018 2) The Ancient Origins of Both Light and Dark Skin. Ed Yong, The Atlantic 2017 https://www.theatlantic.com/science/archive/2017/10/a-brief-history-of-the-genes-that-color-our-skin/542694/	1.1; 1.2; 3.2; 3.3 4.1; 4.2
Thur 2/29	Philosophical contexts for race	1) Perez-Rodriguez, J.; De La Fuente, A. "Now is the Time for a Postracial Medicine: Biomedical Research, the National Institutes of Health, and the Perpetuation of Scientific Racism." American Journal of Bioethics, 2017. 2) Hacking, Ian. "Why race still matters." *Daedalus* 134.1 (2005): 102-116.	1.1; 1.2; 3.3; 3.3; 4.1; 4.2
Tues 3/5	Genetic predictors and educational justice	1) Katheryn Paige Harden: https://nautil.us/issue/107/the-edge/how-to-build-a-society-for-all-to-enjoy 2) Panofsky, Aaron. "Biology meets public policy." Science 373.6562 (2021): 1449-1449. 3) https://www.lareviewofbooks.org/article/why-dna-is-no-key-to-social-equality-on-kathryn-paige-hardens-the-genetic-lottery	1.1; 1.2;4.1; 4.2
Thur 3/7	in class wrap up	No reading (group activity/discussion)	1.1; 1.2; 2.2; 4.1; 4.2

Tues 3/12 and Thur3/14 NO CLASS SPRING BREAK	

Genetic Selection and Enhancement			ELOs
Tues 3/19	Genetic screening and manipulation in humans	1) Online packet on genetic screening 2) Knox 2014 Gene Genie	1.1; 3.1; 3.2; 3.3; 3.4
Thur 3/21	Ethics of selection and enhancement	1) Stramondo, Joseph. "Disabled by design: Justifying and limiting parental authority to choose future children with pre-implantation genetic diagnosis." Kennedy Institute of Ethics Journal 27.4 (2017): 475-500. 2) J. Savulescu & G. Kahane. The Moral Obligation to Create Children with the Best Chance of the Best Life. Bioethics 2009; 23: 274–290.	1.1; 3.1; 3.2; 3.3; 3.4
Tues 3/26	in class wrap up	No Reading (group activity/discussion)	1.1; 2.2 3.1; 3.2; 3.3; 3.4

POSTER PRESENTATION DAYS	
Thur 3/28 poster presentations Day 1	**1.2; 2.2**
Tues 4/2 poster presentations Day 2	**1.2; 2.2**

Research ethics and genetics			
Thur 4/4	Scientific approaches to equity and inclusion in healthcare	1) Special report on "The 'All of Us' Research Program" 2019 NEJM 2) Kenneth Weiss 2017 "Is Precision Medicine Possible" Issues in Science and Technology	1.1; 3.1; 3.2; 3.3; 3.4; 4.1; 4.2
Tues 4/9	Philosophical Concerns of Research Ethics	1) Tsosie, Krystal S., et al. "We Have "Gifted" Enough: Indigenous Genomic Data Sovereignty in Precision Medicine." The American Journal of Bioethics 21.4 (2021): 72-75. 2) Tsosie, Krystal S., Joseph M. Yracheta, and Donna Dickenson. "Overvaluing individual consent ignores risks to tribal participants." Nature Reviews Genetics 20.9 (2019): 497-498. https://www.cbc.ca/radio/ideas/how-indigenous-scientists-are-using-biomedical-research-to-seek-genomic-justice-1.6190855 3) Wendler, David S. "The claims of biospecimen donors to credit and compensation." *Trends in Genetics* 36.9 (2020): 630-632. 4) Truog, Robert D., Aaron S. Kesselheim, and Steven Joffe. "Paying patients for their tissue: The legacy of Henrietta Lacks." *Science* 337.6090 (2012): 37-38.	1.1; 3.1; 3.2; 3.3; 3.4; 4.1; 4.2
Thur 4/11	in class wrap up	No Reading (group activity/discussion)	1.1; 2.2 3.1; 3.2; 3.3; 3.4; 4.1; 4.2

Closing activities			
Tues 4/16	Class wrap up	No Reading	2.2
Thur 4/18	peer review	Submit your rough draft online and bring a hard copy to class	1.2; 2.2

FINAL PROJECT: The final draft of your paper is due on **Thursday April 25th**

We will not have any in-person final exam.

Expectations for Public Philosophy/Public Science Communication Exercises:

Throughout the semester, you will be honing your skills of critical analysis, persuasive argument, and clear philosophical and scientific writing.

You will have five opportunities to complete the short writing pieces, and **must complete two** of them. **At least one** must be completed before spring break (ie from the first two modules). Writeups are due one week after the close of each module. We are interested in **your** thoughts, thus the use of Artificial Intelligence LLMs (like ChatGPT) is inappropriate for these assignments.

Since many of these communication formats do not lend themselves to formal in-line citations, you **must** also submit a short paragraph that includes citations for at least two scholarly sources and a description of how you incorporated the ideas found in these citations into your writing.

For each assignment, write a short (500-600 word) piece meant to be used to communicate in some public way about the topics we discuss throughout the module. Your work can take on one of the following forms (or you can be creative and come up with your own idea):

- newspaper op-ed
- blog post
- short story/scripted short skit
- a letter to the editor in response to a recent article
- a letter to a political representative or a script for a phone call to a political representative
- Communication appropriate for some online medium or social media platform (Reddit, TikTok, blog or Facebook post, etc.), that explains the philosophical or scientific nuances in a way that engages non-course participants.

We will provide prompts for each module, but you should feel free to be creative and do a write up that is sparked by any of the readings/activities in the module. Any issue that falls at an intersection between genetics and philosophy related to the topic of the module is acceptable

Writeups will be assessed based on:

Engagement and Accuracy:

- Does the write-up engage with both scientific and philosophical issues?
- Does the write-up accurately communicate the scientific issues at play?
- Does the write-up accurately communicate the philosophical issues at play?

Persuasiveness:

- Does the write up make a persuasive argument in favor their stated position?
- Is the writing clear and succinct?
- Would the write up be compelling to a non-expert audience?

Creativity:

- Does the write-up present novel points that were not explicitly made in the readings?
- Is there some example, story, case that makes the scientific and philosophical issues salient to the audience?

Genes and Society Project Goals and Expectations

Your semester project will culminate in an original research paper in which you bring ethical or philosophical thinking to bear on an issue of your choice having to do with genetics. The goal of the assignment is to get you to engage in independent critical thinking and argumentation about genetics, by deploying the analytical tools you have been learning and using in class. In this paper, you will:

- identify and explain some ethical or philosophical issues that arise in connection with some facts, principles or technology having to do with genetics.
- clearly explain the scientific subject matter, citing at least three separate sources.
- identify and explain some ethical or philosophical issues that arise in connection with this topic, citing at least three separate scholarly sources.
- adopt a clear position with respect to these issues, and argue in favor of it.

Think of this paper as a position paper on a topic, in which you are trying to educate an intelligent reader who does not have the same background in genetics as you and persuade them to adopt the view of the topic that you wish to defend. We are interested in **your** thoughts, thus the use of Artificial Intelligence LLMs (like ChatGPT) is inappropriate for these assignments.

The final paper should be approximately 1800 words, which is about 6-7 pages, depending on formatting.

Identifying a topic (topic approval required by March 1st): This may be the hardest part! You want to come up with an interesting and original topic that has both scientific and philosophical implications. Note that this topic does not need to relate directly to any of the modules covered in class, it merely needs to be an interesting intersection of genetics and philosophy. You are welcome to discuss your ideas with us at any time, and we encourage you to start thinking in early February. For formal approval you need to submit (on carmen) a ½ - 1 page overview outlining the scientific issue you plan to discuss, and some ethical or philosophical questions that are attached to this issue. Your submission should also tell us what position you hope to argue for, and will begin to sketch your argument. Note that the most interesting topics will be those on which reasonable people might disagree! Your persuasive argument is more interesting if you are arguing in opposition to viewpoints that are held by real people. The February 22nd working day is a great time for us to give you feedback on the topic and help you narrow the focus of your philosophical/ethical question so that it can be answered in 1800 words.

Developing your idea: By engaging with your topic in multiple different ways (poster, rough draft) and receiving feedback along the way, you have an opportunity to refine (or even alter) your viewpoint and arguments. The reality is that all good writing goes through many drafts, and you may find that the process of researching and building your argument actually fine-tunes or even changes your stance. This is to be expected!

What contributes to our assessment?

Every good paper will do a good, clear job explaining the scientific subject matter, explaining the ethical issues, and arguing clearly and well in favor of a clear position.

Beyond that, there is no simple formula for writing a good paper of this sort. Here are a few different ways that your paper could be good. A good paper need not do all of them—you will have to make some decisions about what makes sense given your ideas and interests.

Final papers will be assessed based on:

Strength of scientific discussion.

- If you are able to identify a scientific subject, case or issue that we have not discussed, and explain it well, that would be great.
- If instead you write about a scientific topic we have already discussed (which is perfectly ok to do) then bringing in some new information about it, that is relevant to your ethical questions, would be another way of doing something original.
- Explaining some complex scientific issues in a way that is correct in detail but also comprehensible to non-specialists is a strength.

Strength of ethical/philosophical discussion

- Try to identify interesting issues, in areas where the right thing to think is not clearly obvious and where reasonable people may disagree. If you can identify ethical/philosophical questions that we have not already been considering, that would be especially great, but you can also come up with a novel argument or example that illuminates the ethical issues in a striking way.
- You do not have to use the specific philosophical theories or tools we have discussed, but applying some of those ideas in a novel context might be a feature of a good paper.
- You do not have to frame your argument in valid premise/conclusion form, but doing that might be a feature of a good paper.
- You can enrich a philosophical discussion by considering possible important objections to your view, and (if you can do so effectively) responding to them.

General advice for paper writing

- Determine what you want to argue for—your paper should be arguing FOR a position. Write a clear introduction in which you explain what the paper will argue for (It's not a mystery story – your reader should know where you are headed from the very beginning!) In the conclusion, make clear how you have done what you set out to do.
- Keep the central question(s) that you are dealing with in mind at all times. Maintain a through-line and argumentative flow: it should be clear to the reader why the things that come up are coming up when they do. In the argumentative parts of the paper, this flow can often be achieved by explaining a theory or idea, developing an objection to it, and considering a reply.
- Be sure to consider opposing ideas and positions. Try to think about what is the best thing that could be said *against* your position. Develop your opponent's objection for them and then rebut it as best you can. It is better to show appreciation for potential weaknesses in your position and try to address them than to seem not to notice them. It is better to argue against one important objection rather than bring up a number of challenges that are low hanging fruit that can easily be dismissed.
- Limit your explanations to issues that are relevant to the topic of your paper—there are lots of things you could say about genetics or morality that would be true but not directly relevant to your topic. Be sure to make clear how the thing that you are explaining is important for the specific question(s) your paper aims to address. Explain things clearly, but be concise where you can. Don't pad the paper with irrelevant details. If you find you don't have enough to say, write your first draft short and then try to get feedback and think about objections. A short paper is better than one with filler.
- Use your terms thoughtfully and with precision and don't vary your vocabulary for important concepts just to mix things up:

    - Ex: “It is illegal…” ≠ “It is wrong…” ≠ “It is bad…” ≠ “It is punishable by law…”
- Do not worry about repeating certain terms, especially when those terms are integral to your argument. Your reader should be focusing on your arguments and not on your language choices. The plainer and more consistent the language you use, the clearer your arguments will come through.
- Unlike current scientific writing, papers like this benefit by being written in the active voice. Don’t be afraid to take ownership of your stance. Phrases like “I will argue that..” are expected in this kind of writing.

General advice on sources

If your idea is prompted by or discussed in (for example) the news or online, you can certainly cite those sources as examples of how the issue is perceived in the public. However, scientific issues should be backed by scholarly sources. Philosophical discussions should include citations to any literature you consult, but citations to course notes are not necessary. Note that Wikipedia generally does NOT constitute a scholarly source, but the Stanford Encyclopedia of Philosophy does.

Additional expectations for poster presentations

Your Genes and Society Project assignment is to bring ethical or philosophical thinking to bear on an issue of your choice having to do with genetics. We want you to do independent critical thinking and argumentation about genetics, deploying the analytical tools you have been learning and using in class. We are interested in **your** thoughts, thus the use of Artificial Intelligence LLMs (like ChatGPT) is inappropriate for these assignments.

Posters are a common method of communication in many scientific fields, though they are less common in the humanities. Posters provide a visual overview of the topic you plan to present. A strong poster will rely primarily on illustrations with limited text, usually in the form of bullet points.

Illustrations on the poster provide a way for you to visually outline or emphasize complex ideas for your audience. One useful way to design a poster is to think of your presentation as a 5-6 minute powerpoint presentation, and make a figure on the poster corresponding to each of the slides you would need to use. Any images you take from other sources must be cited on the poster.

On our presentation days we will put up several posters at a time, and students will have the opportunity to circulate and chat to the presenters of posters that interest them. When your poster is up, you will "present" your poster to visitors as they circulate through, including your peer evaluators and the instructors. Due to time limitations, you should be able to complete your entire presentation in 5-6 minutes if there are no interruptions or questions. Prior to the presentation day, you will record a 5-minute presentation of your poster that will be submitted to carmen at the same time as your poster.

When you are in the "audience" you will be assigned two specific posters that you must provide formal, written feedback for. Make sure to visit those posters first. After that you may wander and visit any poster of interest to you.

Posters and presentations will be assessed based on their:

- Clear explanation of the scientific subject matter of your project, citing at least two separate sources.
- Clear identification and explanation of some ethical or philosophical issues that arise in connection with this topic.
- Adoption of a clear position with respect to these issues, and argument in favor of that position.
- Identification of possible counterarguments.
- Citations listed wherever appropriate (we anticipate most students will have identified at least four scholarly sources by this time)

Our assessment takes into account the expectation that the project is still in development. It is very common for projects to take on some new directions between the poster and the final paper.

One challenge of poster presentations is that your audience is more likely to ask questions as you go along, meaning you need to have a deep understanding of your topic in order to be able to get back on track.

The best posters are clear, concise, and informative. They have a structure that makes it easy to

follow your logic, and they are easy to read. They use strong visual elements and limited text to emphasize important points. Given that your project is still in the development stage it may be appropriate for you to include open questions that you are still working on.

Pragmatic details:

- You may design your poster in a single powerpoint "slide" with the appropriate final dimensions (we have posted sample templates)
- Text on a poster should be readable from a few feet away (headings should be at least 36 points, other text at least 28 points)
- You are permitted to use figures from other sources (for instance if you are presenting scientific support for your argument based on a published paper) but these images MUST BE CITED (and make sure that you are not using up too much of your poster on the work of others)
- The only "blocks" of text used should be an abstract (optional), and a reference list (required) -- these can use smaller font sizes
- The cheapest places to print posters are the plotter printers in Thompson Library or Stillman Hall, where a 36 inch by 48 inch poster costs $14 (pay with BuckID only) (note that these printers do not do well with dark colored backgrounds, so we suggest you use a poster template with a white background)
- You will also upload a copy of your poster and a video of your presentation to Carmen to aid us in providing feedback.

Online resources for poster design:

- https://www.uhd.edu/academics/sciences/scholars/Documents/workshop-poster.pdf
- https://semo.libguides.com/humanitiesposters
- http://betterposters.blogspot.com/

GE Theme course submission worksheet: Traditions, Cultures, & Transformations

Overview

Courses in the GE Themes aim to provide students with opportunities to explore big picture ideas and problems within the specific practice and expertise of a discipline or department. Although many Theme courses serve within disciplinary majors or minors, by requesting inclusion in the General Education, programs are committing to the incorporation of the goals of the focal theme and the success and participation of students from outside of their program.

Each category of the GE has specific learning goals and Expected Learning Outcomes (ELOs) that connect to the big picture goals of the program. ELOs describe the knowledge or skills students should have by the end of the course. Courses in the GE Themes must meet the ELOs common for **all** GE Themes and those specific to the Theme, in addition to any ELOs the instructor has developed specific to that course. All courses in the GE must indicate that they are part of the GE and include the Goals and ELOs of their GE category on their syllabus.

The prompts in this form elicit information about how this course meets the expectations of the GE Themes. The form will be reviewed by a group of content experts (the Theme Advisory) and by a group of curriculum experts (the Theme Panel), with the latter having responsibility for the ELOs and Goals common to all themes (those things that make a course appropriate for the GE Themes) and the former having responsibility for the ELOs and Goals specific to the topic of **this** Theme.

Briefly describe how this course connects to or exemplifies the concept of this Theme (Traditions, Cultures, & Transformations)

In a sentence or two, explain how this class "fits' within the focal Theme. This will help reviewers understand the intended frame of reference for the course-specific activities described below.

Taught across two interdisciplinary departments—Molecular Genetics and Philosophy—this course engages with notions of traditions and transformations in cultures and social institutions by exploring the intersections of genetics and philosophy and explicitly interrogating how our understandings of genetics inform ongoing societal discussions around the rapid changes resulting from new genetic understandings and technologies. We discuss how new genetic technologies like genetic engineering are transforming our society, and how new understandings of the genetic contributions to categories like race, sex, sexuality, gender, disability, personality, and behavior are contributing to ongoing societal discussions.

Connect this course to the Goals and ELOs shared by *all* Themes

Below are the Goals and ELOs common to all Themes. In the accompanying table, for each ELO, describe the activities (discussions, readings, lectures, assignments) that provide opportunities for students to achieve those outcomes. The answer should be concise and use language accessible to colleagues outside of the submitting department or discipline. The specifics of the activities matter—listing "readings" without a reference to the topic of those readings will not allow the reviewers to understand how the ELO will be met. However, the panel evaluating the fit of the course to the Theme will review this form in conjunction with the syllabus, so if readings, lecture/discussion topics, or other specifics are provided on the syllabus, it is not necessary to reiterate them within this form. The ELOs are expected to vary in their "coverage" in terms of number of activities or emphasis within the course. Examples from successful courses are shared on the next page.

Goal 1: Successful students will analyze an important topic or idea at a more advanced and in-depth level than the foundations. In this context, "advanced" refers to courses that are e.g., synthetic, rely on research or cutting-edge findings, or deeply engage with the subject matter, among other possibilities.

Goal 2: Successful students will integrate approaches to the theme by making connections to out-of-classroom experiences with academic knowledge or across disciplines and/or to work they have done in previous classes and that they anticipate doing in future.

	Course activities and assignments to meet these ELOs
ELO 1.1 Engage in critical and logical thinking.	This course will build skills needed to engage in critical and logical thinking about the intersections of genetics and philosophy at an advanced level through: 1. Foundational readings and lectures that provide students with critical tools needed to understand and engage in logical thinking surrounding the intersection of genetics and philosophy and to apply this thinking to ongoing discussions around cultural transformations. 2. Weekly reading responses which require the students to synthesize and critically evaluate cutting-edge scholarship on the science of genetics as well as foundational and current philosophical considerations in these areas (for example the intersections of behavioral genetics and moral responsibility, the intersection of the science of race and gender with philosophical discussions of their roles in society, the intersections of genetic modification and societal concerns about human disability and enhancement) 3. Engagement in class-based discussion and debates on the science of genetics, and intersections between sciences and philosophy in current society. Each module is completed with a discussions around a case that integrates some aspect of current genetic science with philosophical and ethical discussions in that area. Students work in groups to critically evaluate and contextualize the case in scaffolded steps for the duration of the session, and to provide policy or other recommendations (representative sample module closing activities are included in the materials submitted to the curricular system).
ELO 1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or ideas within this theme.	Students will move beyond the in-class activities to perform independent scholarly applications at the intersections of genetics and philosophy and their roles in cultural transformations.in the following ways:

	1) At the end of each module, students will have the opportunity to complete a short writing piece that is intended to communicate in some public way about the topics we discuss throughout the module. Students may respond to provided prompts or engage with a novel topic of their choosing, but must incorporate at least two scholarly sources in their work. All students will complete two short writing activities over the course of the semester. Expectations appear in the syllabus, and sample prompts are included in the submitted materials (representative sample module closing activity samples are included in the materials submitted to the curricular system) 2) Completion of a major, scaffolded project that explores a topic of interest at the intersections of genetics and philosophy, culminating in a scholarly final paper. Students will begin developing their topic early in the course, and will re-engage and receive feedback at several points including a topic brainstorming day, a poster presentation, and rough draft evaluations prior to submission of the final paper. The poster presentations are modeled after conference poster sessions and give students the opportunity to demonstrate their in-depth knowledge to a wider audience for feedback. Expectations for the project appear in the submitted syllabus.
ELO 2.1 Identify, describe, and synthesize approaches or experiences.	Students will engage in advanced exploration of module topics (eg the intersections of behavioral genetics and moral responsibility, the intersection of the science of race and gender with philosophical discussions of their roles in society, the intersections of genetic modification and societal concerns about human disability and enhancement and) through a combination of readings, interactive lectures and discussions. During module closing activities described above, students are encouraged to apply their knowledge from this and prior coursework as well as their lived experiences to cases related to the module topic (representative examples of activities included in submitted materials). The short writing assignments and major scaffolded project outlined above also provide major opportunities for students to identify, describe, and synthesize experiences related to the course topic.
ELO 2.2 Demonstrate a developing sense of self as a learner through reflection, self-assessment, and creative work, building on prior experiences to respond to new and challenging contexts.	1) In the short writing assignments discussed above, students write a piece intended for a specific public audience that integrates genetics and philosophy at a level appropriate for that audience, helping them incorporate new knowledge and prior experiences in a creative way and describe it to others (expectations and representative prompts are included in the submitted materials). 2) For the final project students select any topic of interest that bridges genetics and philosophy and complete self-directed, but scaffolded, research and analysis to complete a paper that puts forward and defends a stance regarding a complex topic, requiring them to used multiple approaches to synthesize and expand their knowledge of topics related to the class. 3) Throughout the semester, students will receive feedback both from peers and from the instructors related to their final project. They are expected to write short reflections

	for how they plan to incorporate this feedback into their final assignment. 4) A closing class discussion (prompts included in the submitted materials) explicitly asks student to reflect on their experiences in this and other classes, connect these experiences to wider questions of how we teach genetics and philosophy, and provide suggestions to better help others understand the intersection of these two fields.

Goals and ELOs unique to Traditions, Cultures, & Transformations

Below are the Goals and ELOs specific to this Theme. As above, in the accompanying Table, for each ELO, describe the activities (discussions, readings, lectures, assignments) that provide opportunities for students to achieve those outcomes. The answer should be concise and use language accessible to colleagues outside of the submitting department or discipline. The ELOs are expected to vary in their "coverage" in terms of number of activities or emphasis within the course. Examples from successful courses are shared on the next page.

GOAL 3: Successful students will engage in a systematic assessment of how cultures and sub-cultures develop and interact, historically or in contemporary society.

GOAL 4: Successful students will engage in a systematic assessment of differences among societies, institutions, and individuals' experience within traditions and cultures.

	Course activities and assignments to meet these ELOs
ELO 3.1 Describe the influence of an aspect of culture (religious belief, gender roles, institutional organization, technology, epistemology, philosophy, scientific discovery, etc.) on at least one historical or contemporary issue.	Numerous modules in the course draw connections between aspects of culture and contemporary issues. Readings and in class discussions provide students with the knowledge to describe the influence of aspects of culture on contemporary issues, and module closing activities and short writing assignments provide opportunities for students to cement these understandings. Some sample examples (drawn from several relevant modules outlined in the syllabus): "Behavioral genetics and moral responsibility": Students complete readings that highlight the current state of knowledge around the influence of genetic variation on personality and behavior as well as philosophical theories of moral responsibility. In discussion and module closing activities, students make explicit connections between these understandings and the impact of genetics in the legal system. "Genetics and Philosophy of Social Identities": Sex, Sexuality, and Gender: Students complete readings that highlight the current state of knowledge around the influence of genetic variation on sexual and development and gender identity as well as philosophical theories of gender in society. In discussion and module closing activities, students make explicit connections between these understandings and current discussions surrounding rapid changes in view of gender in contemporary society.

ELO 3.2 Analyze the impact of a "big" idea or technological advancement in creating a major and long-lasting change in a specific culture.	Numerous modules in the course examine the impact of rapidly changing genetic technologies on our contemporary society. Readings and in class discussions provide students with the knowledge to understand the impacts of technological advancements on society as well as the ethical considerations involved in technological and biomedical research. Module closing activities and short writing assignments provide opportunities for students to cement these understandings. One sample example (drawn from several relevant modules outlined in the syllabus): "Genetic Selection and Enhancement": Students complete readings that highlight the current state of technology related to genetic screening and engineering as well as philosophical theories related to parental responsibilities. In discussion and module closing activities, students make explicit connections between the rapidly evolving opportunities to select for or create specific genetic changes and the impacts on our changing culture.
ELO 3.3 Examine the interactions among dominant and sub-cultures.	Several relevant modules examine the interactions between dominant and subcultures, interrogating the effects our understandings of genetics have on these discussions and interactions. Readings and in class discussions provide students with the knowledge to understand how genetic variation affects (or does not) these cultural groups, and how deeper understanding of the science of genetics can upend dominant conceptions of social identity – such as race and gender. Module closing activities and short writing assignments provide opportunities for students to cement these understandings. Critical modules related to this goal include: "Genetics and Philosophy of Social Identities: Race", and "Genetics and Philosophy of Social Identities: Sex, sexuality, and gender". Discussions in the module "Genetic Selection and Enhancement" also interrogate issues surrounding disability.
ELO 3.4 Explore changes and continuities over time within a culture or society.	Several modules provide historical context in readings and discussions to help students contextualize changes and continuities of these discussions in our society. Readings and in class discussions provide students with the knowledge to synthesize and contextualize how our changing understanding of genetics informs changes in social discussions at the intersections of genetics and philosophy, and their effects on cultural transformations. Module closing activities and short writing assignments provide opportunities for students to cement these understandings. Critical modules related to this goal include explicit discussions regarding eugenics in the foundational lectures and in the module "Genetic Selection and Enhancement"; and explicit discussions of the changing understandings of race, sex, and gender in the modules "Genetics and Philosophy of Social

	Identities: Race", and "Genetics and Philosophy of Social Identities: Sex, sexuality, and gender".
ELO 4.1 Recognize and explain differences, similarities, and disparities among institutions, organizations, cultures, societies, and/or individuals.	Through explicit discussion of whether and how genetic variation contribute to health ("Behavioral genetics and moral responsibility", "Genetic selection and engineering") and social identities ("Genetics and Philosophy of Social Identities: Race", and "Genetics and Philosophy of Social Identities: Sex, sexuality, and gender") students are offered numerous opportunities to recognize and describe these similarities and differences, and contextualize how they contribute to disparate outcomes in our society. Readings and in class discussions provide foundational and advanced information on these topics, while module closing activities and short writing assignments provide opportunities to contextualize and synthesize this knowledge, explaining its relevance in ongoing societal discussions
ELO 4.2 Explain ways in which categories such as race, ethnicity, and gender and perceptions of difference, impact individual outcomes and broader societal issues	These topics are most explicitly addressed in the modules surrounding the Genetics and Philosophy of Social Identities. Through lectures and readings, students are introduced to current and cutting edge research in how genetic variation does and does not influence these social identities, as well as being grounded in philosophical theories about the nature of these categories in our current society. Throughout the semester, students will also engage with readings and cases related to inclusive practices of genetic research and challenges to generalizability, applicability and representativeness of genetics research to the target populations. Module closing activities and short writing assignments give students the opportunity to contextualize and expand their understandings and make connections to broader societal issues.

Interdisciplinary and Integrated Collaborative Teaching Course Inventory

Overview

The GE allows students to take a single, 4+ credit course to satisfy a particular GE Theme requirement if that course includes key practices that are recognized as integrative and high impact. Courses seeking one of these designations need to provide a completed Integrative Practices Inventory at the time of course submission. This will be evaluated with the rest of the course materials (syllabus, Theme Course submission document, etc). Approved Integrative Practices courses will need to participate in assessment both for their Theme category and for their integrative practice.

Please enter text in the boxes below to describe how your class will meet the expectations of Interdisciplinary and Integrated Collaborative Teaching courses. It may be helpful to consult your Director of Undergraduate Studies or appropriate support staff person as you complete this Inventory and submit your course.

Please use language that is clear and concise and that colleagues outside of your discipline will be able to follow. You are encouraged to refer specifically to the syllabus submitted for the course, since the reviewers will also have that document. Because this document will be used in the course review and approval process, you should be *as specific as possible*, listing concrete activities, specific theories, names of scholars, titles of textbooks etc.

Accessibility

If you have a disability and have trouble accessing this document or need to receive it in another format, please reach out to Meg Daly at daly.66@osu.edu or call 614-247-8412.

Pedagogical Practices for Interdisciplinary and Integrated Collaborative Teaching Courses

Course subject & number Molgen/Philos 2690

Please answer the 3 questions below.

"Collaborative"
Meaning and context: Teaching partners are expected to collaborate on (1) defining the objectives for the course, (2) putting together the course materials, (3) conducting the formal instruction of students, and (4) evaluating student performance. Note that courses in which one faculty member of record convenes the course and invites one or more guest speakers to take part in the class are not considered courses taught collaboratively. (Those courses may, however, utilize outside speakers when appropriate *in addition to* the primary faculty members of record.)

In the box below, list which two or more faculty members from what departments/units within which college(s) will engage in the interdisciplinary and integrated collaborative teaching. (This information should also be readily visible on the syllabus.)

Susan Cole (Molecular Genetics) and Justin D'Arms (Philosophy) originally developed the course. Currently, the 3-credit hour version of the course is offered annually with Susan Cole as the instructor from Molecular Genetics and Justin D'Arms and Dana Howard alternating as the representative from Philosophy.

"Interdisciplinary"
Meaning and context: Participating faculty must be from *demonstrably* different disciplines, programs, or departments. (Think along the lines of Art & Molecular Genetics, Pharmacy & History, Public Health & Music, etc.)

In the box below, explain what the distinct disciplines and contributions of each faculty member are. Furthermore, explain where and how these will show in/contribute to the course GEN Theme. (This information should also be readily visible on the syllabus.)

Genes and Society (MOLGEN/PHILOS 2690) is an interdisciplinary exploration of the science of genetics and the philosophical, ethical, and societal implications of its findings. Team taught by a philosopher (D'Arms or Howard) and a molecular biologist (Cole), this course promotes student engagement in a broad, interdisciplinary conversation, promoting understanding both of the science of genetics, and the ways this science has been integrated into social and ethical conversations about the nature of humanity. The field of genetics has identified DNA as the repository of genetic information, and provides links between inherited changes in DNA sequences and a variety of physical and behavioral traits in all organisms. More recently, genetic optimism has suggested that knowing gene sequences would revolutionize science, medicine, and society. However, our understandings (and misunderstandings) of genetic inheritance have had enormous societal impacts that are not generally engaged during coursework aimed at science majors, and discussions of these issues in the context of humanities can be impeded by a comparatively weaker understanding of the science.

Here, the combined expertise of instruction from Molecular Genetics and Philosophy provides groundwork and advanced insight into the intersections of science and philosophy, especially as they relate to cultural traditions, cultural transformations, and medical and legal norms as they are triggered by changes in scientific understanding and technology. This dual support will help students to understand the science that

underlies genetic inheritance, and inform their understanding of how knowledge of genetic shapes societies. Starting in the early 1900s when the work of Mendel and Darwin were first connected, our understanding of how genes influence traits and behaviors have had wide-ranging consequences, ranging from implementation of eugenic policies, to upheavals due to genetic screening and genetic therapies, to changes in how we view race,sex, and disability, to recent proposed revolutions in individualized medicine. Guided by the co-instructors, this course enables students to consider the philosophical, social, and ethical implications of genetics, from a position that is firmly grounded in an understanding of modern molecular genetics.

"Integrated"

Meaning and context: Interdisciplinary integrative teaching is different from multidisciplinary teaching where "faculty present their individual perspectives one after another, leaving differences in underlying assumptions unexamined and integration up to the students. In interdisciplinary courses […] faculty interact in designing a course, bringing to light and examining underlying assumptions and modifying their perspectives in the process. They also make a concerted effort to work with students in crafting an integrated synthesis of the separate parts that provides a larger, more holistic understanding of the question, problem, or issue at hand." (Klein & Newell, 12)

In the box below, explain how the faculty members will be teaching the course together by being both present during all or most course meetings (<u>at least</u> 50% of the meetings) and bringing their different disciplines and perspectives into dialogue to address the GEN Theme. Exactly where and in what manner will this happen? What kinds of assignments will the students produce that demonstrate their ability to integrate the different disciplinary questions, methods, or knowledge to address the GEN Theme at hand? Be specific. (This information should also be readily visible on the syllabus.)

Both instructors are present during all class sessions. In many sessions, one instructor takes "lead", assigning readings and guiding discussions. We have found that the other instructor can usefully model appropriate discussion and inquiry, both by requesting clarification and by providing input from alternate viewpoints. The instructors have worked together to develop closing in-class activities for each module that synthesize the scientific and philosophical materials covered in class, and work together to guide and debrief these activities. Sample prompts for a selection of these closing activities have been uploaded to the curriculum system. Both instructors are actively engaged in evaluating all student assignments; and students receive feedback from both instructors on all Genes and Society project milestones..

Additional assignments require students to integrate the fields of genetics and philosophy:

1) The Public Philosophy/Public Science Communication Exercises (students complete two over the course of the semester) This can take various forms, such as a newspaper op-ed, a letter to the editor in response to a recent article, a letter to a political representatives, a script for a call to a political representative, a Facebook post, or a blog post. Any issue that falls at an intersection between genetics and philosophy related to the topic of the module is acceptable, and writeups are required to accurately engage with both science and philosophy, and articulate and defend a related position for the specified audience. Expectations are found in the submitted syllabus, and sample prompts for a selection of these writing assignments have been uploaded to the curriculum system. Here, by deeply understanding connections between genetics and current social concerns and communicating to a broad audience, students will engage with the theme topic of traditions, cultures, and transformations.

2) The Genes and Society project is a scaffolded project that culminates in an original research paper in which students bring ethical or philosophical thinking to bear on an issue of their choice having to do with genetics. The goal of the assignment is to facilitate independent critical thinking and argumentation about genetics, deploying the analytical and philosophical tools used in class. In this paper, students must identify and explain some ethical or philosophical issues that arise in connection with some facts, principles or technology having to do with genetics and must clearly explain the scientific subject matter along with ethical or philosophical issues that arise in connection with this topic. Expectations are found in the submitted syllabus. This assignment provides an opportunity for students to engage with the theme topic of traditions, cultures, and transformations by performing their own scholarly research and thinking on a topic of interest to them.