

## Term Information

Effective Term Autumn 2019

## 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: 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

## Prerequisites and Exclusions

Prerequisites/Corequisites  
Exclusions Not open to students with credit for Molecular Genetics 2690  
Electronically Enforced Yes

## Cross-Listings

Cross-Listings Cross-listed with Molecular Genetics

## Subject/CIP Code

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

## **Requirement/Elective Designation**

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**

- Genes and Society syllabus submitted.docx: Syllabus  
*(Syllabus. Owner: O'Keeffe, Susan B)*
- Genes and Society course proposal submitted.docx: Course proposal for team taught class  
*(Other Supporting Documentation. Owner: O'Keeffe, Susan B)*
- Phil endorsement genes and soc.pdf: Chair support letter PHILOS  
*(Other Supporting Documentation. Owner: O'Keeffe, Susan B)*
- Genes and Society - Molgen Departmental Letter.pdf: Chair support letter MOLGEN  
*(Other Supporting Documentation. Owner: O'Keeffe, Susan B)*
- Philosophy Undergraduate Curriculum Map.docx: PHILOS revised curriculum map  
*(Other Supporting Documentation. Owner: O'Keeffe, Susan B)*
- MolGenCurriculumMap\_2018\_with\_GnS.xlsx: MOLGEN revised curriculum map  
*(Other Supporting Documentation. Owner: O'Keeffe, Susan B)*
- Genes and Society - Cover letter.docx: Cover letter  
*(Cover Letter. Owner: O'Keeffe, Susan B)*

**Comments**

- This team taught course is being submitted in response to the 2018 call for team teaching grant proposals *(by O'Keeffe, Susan B on 08/30/2018 10:55 AM)*

**Workflow Information**

Status	User(s)	Date/Time	Step
Submitted	O'Keeffe, Susan B	08/30/2018 11:57 AM	Submitted for Approval
Approved	Downing, Lisa J	08/30/2018 03:01 PM	Unit Approval
Approved	Heysel, Garrett Robert	08/31/2018 12:16 PM	College Approval
Pending Approval	Nolen, Dawn Vankeerbergen, Bernadette Chantal Oldroyd, Shelby Quinn Hanlin, Deborah Kay Jenkins, Mary Ellen Bigler	08/31/2018 12:16 PM	ASCCAO Approval



August 29, 2018

Steve Fink, PhD  
Associate Executive Dean,  
College of Arts and Sciences  
114 University Hall, 234 North Oval Mall,  
Columbus, OH 43210

Dear Dr. Fink;

We are delighted to submit this proposal for an interdisciplinary, team taught course to be entitled "Genes and Society" in response to the 2018 call for team teaching grant proposals. This course will be jointly offered by the Departments of Molecular Genetics and Philosophy and will be team taught by Justin D'Arms and Susan Cole. Per the grant proposal request, we have uploaded to curriculum.osu.edu the course proposal describing the class, a syllabus, support letters from the chairs of the two departments, and revised curricular maps indicating how this course will be integrated into our majors.

The course targets a broad audience and explores 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. It is expected to be attractive to a wide variety of students across the Arts and Sciences.

Please let us know if you need any further information

Susan Cole  
Professor of Molecular Genetics  
cole.354@osu.edu

Justin D'Arms  
Professor of Philosophy  
darms.1@osu.edu

**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  
email: cole.354@osu.edu  
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<sup>[L]</sup><sub>[SEP]</sub> Web: [slds.osu.edu](http://slds.osu.edu).”

## TENTATIVE SCHEDULE

WEEK	FOCUS
1-2	<p>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</p> <p>READINGS:</p> <ol style="list-style-type: none"> <li>1) Chapters 11 and 12 of Biology 2e available through OpenStax</li> <li>2) Plato, selections from Republic</li> <li>3) Shafer Landau, Fundamentals of Ethics, Introduction</li> </ol>
3-4	<p>Gene:phenotype correlations</p> <ul style="list-style-type: none"> <li>• Types of mutations and what they can do mechanistically</li> <li>• “Single” gene traits vs multigenic traits</li> <li>• Issues with penetrance and expressivity</li> <li>• Gene environment interactions</li> </ul> <p>Philosophical issues concerning responsibility and determinism</p> <ul style="list-style-type: none"> <li>• What is responsibility?</li> <li>• Is it compatible with determinism?</li> <li>• How might different understandings of genetic influence on behavior bear on responsibility?</li> </ul> <p>READINGS:</p> <ol style="list-style-type: none"> <li>1) Chapter 13 of Biology 2e available through OpenStax</li> <li>2) “Mutations and Health” Genetics Home Reference at National Library of Medicine (<a href="https://ghr.nlm.nih.gov/primer#mutationsanddisorders">https://ghr.nlm.nih.gov/primer#mutationsanddisorders</a>)</li> <li>3) Harry Frankfurt, “Freedom of the Will and the Concept of a Person”</li> <li>4) Robert Kane, “Reflections on Free Will, Determinism and Indeterminism”</li> </ol>
5-6	<p>Genetics of sex determination/ gender/ sexuality</p> <ul style="list-style-type: none"> <li>• How do you define “sex”</li> <li>• Phenotypic expression of “sex”</li> <li>• How does genotype influences gender and/or sexuality</li> <li>• Biological, Social, and normative conceptions of sex and gender</li> </ul> <p>READINGS:</p> <ol style="list-style-type: none"> <li>1) Hake, L. &amp; O'Connor, C. (2008) Genetic mechanisms of sex determination. Nature Education 1(1):25</li> <li>2) Beyond XX and XY Amanda Montañez Scientific American 317, 50-51</li> <li>3) When Sex and Gender Collide Kristina R. Olson Scientific American 317, 44-49</li> <li>4, Sally Haslanger, “Gender and Race: (What) Are They, (What) Do We Want Them to Be”</li> </ol>

MIDTERM 1 will be held on Monday of Week 7



7-8	<p>Genetic modification and gene editing</p> <ul style="list-style-type: none"> <li>• Modification of crops and domestic animals</li> <li>• Potential modification of humans</li> <li>• Ethical challenges to gene modification: consequentialist and other</li> </ul> <p>READINGS:</p> <ol style="list-style-type: none"> <li>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 <a href="https://www.ncbi.nlm.nih.gov/books/NBK215771/">https://www.ncbi.nlm.nih.gov/books/NBK215771/</a></li> <li>2) The Gene Genie Knox, Margaret Scientific American, 311, 42-46</li> <li>3) Leon Kass, Preventing Brave New World</li> <li>4) Michael Sandel, The Case Against Perfection</li> </ol>
9-10	<p>Genetics and Altruism</p> <ul style="list-style-type: none"> <li>• How could altruism evolve</li> <li>• idea of the “selfish gene”</li> <li>• ideas of genetic and psychological altruism, and the value of altruism</li> </ul> <p>READINGS:</p> <ol style="list-style-type: none"> <li>1) Chapter 4 of Biofundamentals available through OpenStax</li> <li>2) Excerpt on Kin Selection from The Selfish Gene by Richard Dawkins</li> <li>3) Sober and Wilson, Altruism, selections.</li> </ol>
11	<p>Genetics in medicine</p> <ul style="list-style-type: none"> <li>• Genetic disorders vs disorders with a genetic component</li> <li>• Genetic testing</li> <li>• Personalized medicine</li> <li>• How do we decide what traits can be selected for or against?</li> </ul> <p>READINGS:</p> <ol style="list-style-type: none"> <li>1) FAQs from the NIH about genetic testing (<a href="https://www.genome.gov/19516567/faq-about-genetic-testing/">https://www.genome.gov/19516567/faq-about-genetic-testing/</a>) and pharmacogenomics (<a href="https://www.genome.gov/27530645/faq-about-pharmacogenomics/">https://www.genome.gov/27530645/faq-about-pharmacogenomics/</a>)</li> <li>2) “Genetic Testing” Genetics Home Reference at National Library of Medicine (<a href="https://ghr.nlm.nih.gov/primer#testing">https://ghr.nlm.nih.gov/primer#testing</a>)</li> <li>3) William Shaw, Consequentialism</li> </ol>
12	<p>Genes in the marketplace</p> <ul style="list-style-type: none"> <li>• Gene patents</li> <li>• Buying genetic enhancement</li> <li>• Should the market for genes and their alterations be completely open?</li> </ul> <p>READINGS:</p> <ol style="list-style-type: none"> <li>1) NIH Genome Research Institute “Intellectual Property” (<a href="https://www.genome.gov/19016590/intellectual-property/">https://www.genome.gov/19016590/intellectual-property/</a>)</li> <li>2) Peter Singer, Parental Choice and Human Improvement</li> <li>3) Elizabeth Anderson: Why Some Things Should Not Be For Sale: The Moral Limits of Markets</li> </ol>

13	<p>Genes and privacy</p> <ul style="list-style-type: none"> <li>• Who can access your genetic information and why?</li> <li>• Should genetic information be freely shared?</li> <li>• What is the value of privacy, and are there special concerns regarding genetic privacy?</li> </ul> <p>READINGS:</p> <ol style="list-style-type: none"> <li>1) NIH Genome Research Institute “Privacy in Genomics” (<a href="https://www.genome.gov/27561246/privacy-in-genomics/">https://www.genome.gov/27561246/privacy-in-genomics/</a>)</li> <li>2) Jeffrey Johnson, The Nature and Value of Privacy</li> </ol>
14	<p>Epigenetics</p> <ul style="list-style-type: none"> <li>• Idea of heritable changes that don’t alter DNA structure</li> <li>• Environmental influences that span generations</li> <li>• How does epigenetics change our view of the influence of genes?</li> </ul> <p>READINGS:</p> <ol style="list-style-type: none"> <li>1) Skinner, Michael “The Case for Inheritance of Epigenetic Changes in Chromosomes” Scientific American 2014 311: 44–51.</li> </ol>

**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.

## **Course Proposal for *Genes and Society***

Instructors: Susan Cole (cole.354), Department of Molecular Genetics, and Justin D'Arms (darms.1), Department of Philosophy

In response to the call by the College of Arts and Sciences for new, interdisciplinary team-taught courses, we are delighted to submit a proposal for a new course examining the ethical and societal implications of the science of genetics. This proposal has two parts:

1. A rationale for the course that defines its interdisciplinary nature; explains how the course benefits students, advances department goals, and maps onto department curricula; a discussion of the value of team teaching; a definition of how team teaching will be applied; and learning goals and assessment of student success
2. A full syllabus that presents the learning objectives, assignments, and the framework of the course.

### **Part 1: Rationale for *Genes and Society***

#### **1) Interdisciplinary Nature**

*Genes and Society* is an interdisciplinary exploration of the science of genetics and the ethical and societal implications of its findings. The field of genetics was born in the early 1900s when the work of Gregor Mendel defining inheritance patterns in peas were rediscovered by researchers examining inheritance patterns and chromosomal movements in a variety of systems. The links between a “gene” (a basic unit of inherited information) and a “phenotype” (a visible trait in an organism) were first formally described by Wilhelm Johansen in 1909. An explosion of research over the next century identified DNA as the repository of genetic information, and began to link inherited changes in DNA sequences to a variety of physical and behavioral traits in all organisms. In many ways, the Human Genome project, which produced the first sequence of the human genome in 2003 served as a culmination of genetic optimism, suggesting that knowing gene sequences would revolutionize science and medicine. 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. Team taught by a philosopher and a biologist, this course will help students engage in a broad, interdisciplinary conversation, understanding both the science of genetics, and the ways this science has been integrated into social and ethical conversations about the nature of humanity.

This course will require students to understand the science that underlies genetic inheritance, and use this knowledge to 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 and sex, to recent proposed revolutions in individualized medicine. This course will make it possible for students to consider the medical, social, and ethical implications of genetics, from a position that is firmly grounded in an understanding of modern molecular genetics.

#### **2) Students, Departmental Academic Goals, and Departmental Curricular Maps**

The course will benefit students by providing the structure and expertise to guide them in their contemplation of how research in genetics has reshaped our society. By considering how scientific

perspectives have changed over time and have influenced thinking in other disciplines, students will learn to make connections that cross intellectual boundaries, take on academic challenges, and learn from the instructors and their classmates.

The Department of Molecular Genetics and the Department of Philosophy both support this team-taught course because it integrates with already established intellectual goals and curricular maps in each department.

Coursework in the **Department of Molecular Genetics** aligns with eight main learning goals:

Goal 1. Undergraduate Molecular Genetics majors acquire a basic mastery of fundamental concepts of biology, chemistry, mathematics, physics, and the scientific method;

Goal 2. Undergraduate Molecular Genetics majors acquire a basic mastery of fundamental areas of molecular genetics, including transmission genetics, the central dogma of molecular biology, regulation of gene expression, quantitative and population genetics, genomics, recombinant DNA and biotechnology, and cell and developmental biology;

Goal 3. Undergraduate Molecular Genetics majors develop analytical and problem solving skills in areas of genetics and molecular biology;

Goal 4. Undergraduate Molecular Genetics majors acquire a basic mastery of experimental techniques and approaches used in genetics and molecular biology;

Goal 5. Undergraduate Molecular Genetics majors acquire a basic mastery of data analysis and statistical approaches used in genetics and molecular biology;

Goal 6. Undergraduate Molecular Genetics majors effectively communicate their understanding of genetics and molecular biology both orally and in writing;

Goal 7. Undergraduate majors participate in academic research and/or outreach activities that are consistent with their interests and postgraduate plans;

Goal 8. Undergraduate majors acquire expertise relevant to their chosen area of specialization.

Learning objectives in this class address goals 1-3 and goal 6.

The Genes and Society Course will contribute directly to goals 2, 4, and 6 of the Molecular Genetics Curriculum. The course will count as an elective toward the major or minor in Molecular Genetics. It will have no prerequisites in Biology or Molecular Genetics.

Coursework in the **Department of Philosophy** aligns with four main learning goals:

1. Students develop critical thinking about philosophy

2. Students read, think about, and write about the history of philosophy

3. Students read, think about, and write about topics in contemporary philosophy

4. Students learn formal methods in logic.

The Genes and Society course would contribute directly to goals 1 and 3 of the philosophy curriculum, with some possibility of contributions to goal 2 in future iterations of the course. The course will count as an elective toward the major or minor in Philosophy. It will have no prerequisites in Philosophy.

For more on the value of this course to the respective departments, please refer to the letters of support from the chairs, Harald Vaessin, Molecular Genetics, and Lisa Downing, Philosophy.

### 3) Value of Team Teaching

The instructors, Susan Cole and Justin D'Arms, both contribute content expertise, strong research profiles, excellent teaching credentials, and relevant on-the-ground experience.

**Susan Cole** is a molecular and developmental geneticist, and is a full professor with an appointment in Molecular Genetics (College of Arts and Sciences). She directs a lab that utilizes molecular biology tools to dissect the functional roles of genes in embryonic development. Her teaching in the department, and involvement directing an NSF funded REU site have led her to value the importance of interdisciplinary collaborations as a means to advance scientific knowledge and understanding. Cole has successfully taught undergraduate and graduate genetics, including larger introductory courses in the major as well as elective courses in Developmental Genetics and Human Genetics. She uses numerous active learning techniques to integrate research and education. In 2011 she developed a freshman seminar entitled "Exploring Biology through Fiction" that uses fictional representations of concepts like genetic engineering or human cloning as a starting point to discuss both real science and its ethical and societal implications. The Human Genetics course she developed in 2016 uses structured in class activities to explicitly engage in discussions about the ethical and societal implications of genetic screening, gene therapy, and mass media presentations of science. She has served as a co-director of an NSF-funded Research Experience of Undergraduates Site since 2010. This program has brought over 150 undergraduate students from around the country to OSU to conduct independent research. In a successful grant renewal in 2015, Cole implemented a formal science communication program designed to help these young researchers effectively communicate about their projects with a wide variety of audiences. In 2017 Cole was awarded the Alumni Award for Distinguished Teaching. She is excited to engage in a formal interdisciplinary collaboration that will combine the sciences and humanities to foster critical conversations about genetics as a science and a driver of social change.

**Justin D'Arms** is a full professor of Philosophy. His research and publications range across ethics, theory of value, philosophy of emotion and issues in the philosophy of evolutionary biology. He has taught all of these subjects at Ohio State. His research interests in the evolution of justice and moral behavior animate his enthusiasm for learning more about the contemporary science of genetics.

D'Arms's Introduction to Ethics courses have introduced more than a thousand Ohio State undergraduate students to the systematic study of various contemporary moral problems. He has been involved in several successful collaborative courses in the previous years, but this will be his first interdisciplinary collaborative teaching. He has been a lead investigator on several grants at the interface of science and ethics, including a Templeton grant "The Science of Ethics" and a Battelle (BETHA) grant "Automated Vehicle Ethics." He is on the steering committee of the new major in Philosophy, Politics and Economics which seeks to connect philosophical thinking to other disciplines in systematic ways. He has also been a finalist for an Ohio State University Distinguished Teaching Award.

The instructional team of Susan Cole and Justin D'Arms offers undergraduate students the opportunity to study genetics and ethics with an interdisciplinary team of experts in their respective fields. Both are accomplished teachers with a demonstrated record of helping students connect what they learn in the classroom to the world, and will work together to foster broad conversations between the sciences and humanities. By drawing on expertise across disciplines, this course will offer insights that neither instructor could provide on their own.

#### **4) Form of Team Teaching**

Both instructors will attend all meetings of the course and share equally in all aspects of the course. The early weeks of the course will serve as “boot camp” defining basic knowledge of genetics and philosophy, and providing students with the knowledge and tools to engage in rigorous learning and discussion for the remainder of the course. After these introductory activities, the course will be divided into modules, each of which will revolve around a specific scientific idea that has ethical or societal implications (examples might include understanding gene:phenotype correlations, while discussing how this research contributes to societal beliefs in genetic determinism; understanding the genetics of sex determination/gender/sexuality and how they inform ongoing discussions about rights of LGBTQ individuals; discussing how genetics are changing medical diagnosis and treatment and how this may alter societal perceptions of medicine and delivery of medical treatment. Additional modules are described in the attached syllabus) The course format will combine interactive lectures, small and large group discussions, and formal and informal in-class activities. Both Cole and D’Arms are excited to learn and implement new pedagogical techniques from one-another.

#### **Course Learning Goals and Assessing Student Success**

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

This course will be included in the regular assessment processes of both of the sponsoring departments.

#### **Conclusion**

The proposed course, *Genes and Society*, is an ideal team-taught course. The course challenges students to think across disciplinary boundaries in order to engage with the societal impacts of genetics both at the level of scientific understanding and at the level of ethical questioning. The instructors are both strong and engaging teachers, with a record of student engagement. Their complementary interests and skill sets allow the course to provide opportunities beyond what either instructor could provide on their own.

The course will enrich offerings from each department and will serve as a model for pedagogy that

reaches across arts and sciences, connecting diverse fields and providing a true liberal arts educational experience for enrolled students.

Part 2: Complete Syllabus for *Genes and Society*

Found in neighboring document



**Department of Philosophy**

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230 North Oval Mall  
Columbus, OH 43210-1365

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Fax (614) 292-7502

August 28, 2018

To Whom It May Concern:

I write to strongly endorse the proposal from Professor D'Arms (Philosophy) and Professor Cole (Molecular Genetics) for a new interdisciplinary course, *Genes and Society*. This looks to be a model interdisciplinary course, in that it brings two disciplines together to address a topic where two sets of insights can clearly benefit each other and deepen our understanding. If one wants to reflect critically on the ethical and social implications of genetics, one needs to understand the biology and one needs expertise in ethical theory. These two distinguished faculty can clearly provide this, and, moreover, have laid out a fascinating course convincingly pairing genetic theory with important ethical/social issues.

This course will bring a lot to our curriculum in philosophy. It is quite distinct from our existing courses in moral theory (1300, 3300), in philosophy of biology (3680), and in philosophy of science (2650, 3650), yet we hope it may draw students into these neighboring subjects, by showing them the value and relevance of empirically grounded philosophical reflection. If approved, I would expect this course to be offered very regularly.

Yours sincerely,

Lisa Downing  
Professor and Chair





**Department of Molecular Genetics**

College of Arts and Sciences  
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August 20, 2018

Steve Fink, PhD  
Associate Executive Dean,  
College of Arts and Sciences  
114 University Hall, 234 North Oval Mall,  
Columbus, OH 43210

Dear Dr. Fink;

The Department of Molecular Genetics enthusiastically supports the interdisciplinary course proposal "Genes and Society" by Drs. Susan Cole and Justin D'Arms. The course targets a broad audience and explores 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. Students completing this course will understand that science is not separate from their life but informs many fundamental aspects of our society.

The Genes and Society course will provide our Molecular Genetics majors the opportunity to extend their exploration of genetic content beyond the narrow disciplinary confines. We hope and anticipate that this will also serve as an attractive option for other life science and none-life science majors.

The department is committed to continually offer this course as part of the regular course portfolio.

Sincerely,

A handwritten signature in blue ink, appearing to read "Harald Vaessin".

Dr. Harald Vaessin  
Chair, Professor  
Department of Molecular Genetics

## Philosophy Undergraduate Major Curriculum Map and List of Semester Courses for Major

Required Courses	Course Number	Course Title	Students Develop Critical Thinking about Philosophy	Students Read, Think about, and Write about the History of Philosophy	Students Read, Think, and Write about Topics in Contemporary Philosophy	Students Learn Formal Methods in Logic
(prerequisite)	2500	Symbolic Logic	B			B
	3000	Gateway Seminar	B			
(two of these required)	3210	History of Ancient Philosophy		I		
	3220	History of Medieval Philosophy		I		
	3230	History of 17 <sup>th</sup> Century Philosophy		I		
	3240	History of 18 <sup>th</sup> Century Philosophy		I		
	3250	History of 19 <sup>th</sup> Century Philosophy		I		
	3261	Fundamental Concepts of Existentialism		I		
(two of these required)	3300	Moral Philosophy	I	I	I	
	3530	Philosophy of Logic	I		I	I
	3600	Introduction to Philosophy of Language	I		I	
	3650	Philosophy of Science	I		I	
	3700	Introduction to Metaphysics	I		I	
	3750	Introduction to Theory of Knowledge	I		I	
	3800	Introduction to Philosophy of Mind	I		I	
	3810	Philosophy of Action	I		I	
(two of these required)	5193	Individual Studies	A	A	A	A
	5194	Group Studies	A	A	A	A
	5210	Studies in Ancient Philosophy	A	A		
	5211	Plato	A	A		
	5212	Aristotle	A	A		
	5220	Studies in Medieval Philosophy	A	A		
	5230	Studies in 17 <sup>th</sup> Century Philosophy	A	A		
	5240	Studies in 18 <sup>th</sup> Century Philosophy	A	A		
	5241	Kant	A	A		
	5250	Studies in 19 <sup>th</sup> Century Philosophy	A	A		
	5260	Studies in 20 <sup>th</sup> Century Philosophy	A	A		
	5261	Existentialism and Phenomenology	A	A		

	5263	American Philosophy	A	A		
	5300	Advanced Moral Philosophy	A		A	
	5310	Metaethics	A		A	
	5400	Advanced Political and Social Philosophy	A		A	
	5410	Advanced Philosophy of Law	A		A	
	5420	Philosophical Topics in Feminist Theory	A		A	
	5450	Advanced Aesthetic Theory	A		A	
	5460	Philosophy in Literature	A	A	A	
	5500	Advanced Symbolic Logic	A			A
	5510	Advanced Logical Theory	A			A
	5520	Inductive Logic and Probability Theory	A			A
	5530	Philosophy of Logic and Mathematics	A		A	
	5540	Theory of Rational Choice	A		A	A
	5550	Nonclassical Logic	A			A
	5600	Advanced Philosophy of Language	A		A	A
	5610	Natural Language Metaphysics	A		A	B
	5650	Advanced Philosophy of Science	A		A	
	5700	Advanced Metaphysics	A		A	
	5750	Advanced Theory of Knowledge	A		A	
	5797	Study at a Foreign Institution	A	A	A	A
	5800	Advanced Philosophy of Mind	A		A	
	5830	Advanced Philosophy of Cognitive Science	A		A	
	5840	Introduction to Cognitive Science	A		A	
	5850	Philosophy of Religion	A		A	
	5870	Topics in Jewish Philosophy	A	A	A	
	5891	Proseminar in Cognitive Science	A		A	
Elective Courses: Honors Program	Course Number	Course Title	Students Develop Critical Thinking about Philosophy	Students Read, Think, and Write about the History of Philosophy	Students Read, Think, and Write about Topics in Contemporary Philosophy	Students Learn Formal Methods in Logic
	2450H	Honors Philosophical Problems in the Arts	I		I	
	2470H	Honors Philosophy of Film	I		I	
	2900H	Freshman-Sophomore Proseminar	I	I	I	
	3341H	Ethical Conflicts in Health Care Research, Policy, and Practice	I	I	I	

	4900H	Junior-Senior Proseminar	A	A	A	
Elective Courses: General	Course Number	Course Title	Students Develop Critical Thinking about Philosophy	Students Read, Think, and Write about the History of Philosophy	Students Read, Think, and Write about Topics in Contemporary Philosophy	Students Learn Formal Methods in Logic
	2120	Asian Philosophies				
	2194	Group Studies				
	2340	The Future of Humanity				
	2342	Environmental Ethics				
	2400	Political and Social Philosophy				
	2450	Philosophical Problems in the Arts				
	2455	Philosophy Video Games				
	2465	Death and the Meaning of Life				
	2500	Symbolic Logic				
	2650	Introduction to the Philosophy of Science				
	2660	Metaphysics, Religion, and Magic in the Scientific Revolution				
	2670	Science and Religion				
	2680	Scientific Controversies				
	2690	Genes and Society				
	2850	Introduction to Philosophy of Religion				
	3001	Economy, Polity, and Community				
	3002	Tradition, Progress, and Utopia				
	3111	Introduction to Jewish Philosophy				
	3120	Engaging Time: Philosophical and Rabbinic Dimensions of Temporality				
	3260	Movements in 20 <sup>th</sup> Century Philosophy				
	3262	Contemporary Continental Thought				
	3310	Morality and the Mind				
	3351	Judaism and Ethics				
	3410	Philosophical Problems in the Law				
	3420	Philosophical Perspectives on Issues of Gender				
	3430	The Philosophy of Sex and Love				
	3440	Theorizing Race				
	3680	Sex and Death: Introduction to the Philosophy of Biology				
	3820	Philosophy of Perception				
	3830	Consciousness				
	3870	Jewish Mysticism				

	5010S	Teaching Philosophy	A		A	
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Total Required Hours: 30

Phil 2500; gateway seminar; two 3xxx history courses; two 3xxx systematic courses; two 5xxx courses, one additional course at or above the 2xxx level; and two additional courses at or above the 3xxx level.

B = Beginner Level

I = Intermediate Level

A = Advanced Level

Note that, when a course is permitted to have a range of contents (at the discretion of the instructor), the course has been marked as apt to satisfy the full permitted range of undergraduate educational goals.