I. Bulletin description

G4495. Ethics, Genetics, and the Brain (seminar).
4pts. Mondays 10:10-12 PM in Room 405 Schermerhorn Hall.
Prerequisites: Basic background in neurobiology (for instance PSYC 1010, 2450, 2460, or 2480) and the instructor's permission.

Advances in genetics and neuroscience have expanded our understanding of the biological basis of behavior and risk of psychiatric disorder. However, these advances have implications for decision/policy making, legal issues, and society and raise broad ethical concerns. In this seminar course, we will discuss these implications and issues and consider the future challenges that may arise from the evolving study of the genetic and neurobiological determinants of behavior.

II. Full course description:

This course explores the diverse ethical, legal, and social issues that have emerged from the study of the biological basis of behavior – with a particular focus on how advances in our understanding of genetics and neuroscience impact on these issues. In the first part of the course, the nature of these ethical issues will be highlighted and students will be provided with a primer on the mechanistic link between our genes, brains, and individual differences in behavior/psychological functioning. The impact of these mechanistic links for philosophical debates regarding free will and determinism as well as the implications of genetics and neuroscience for the emergence of consciousness will also be discussed. Following these introductory seminars (weeks 1-4), the class will focus on the impact of genetic and neurobiological information on decision making processes: How does genetics influence reproductive decisions? Can genetic information lead to discrimination? Following student presentations on these topics (week 8), the discussions will focus on how genetic and neurobiological information influences legal decisions and how neuroscience can be used to predict consumer decisions and marketing. Following student presentations on these topics (week 11), class discussions will focus on the topic of genetic/neurobiological engineering and enhancement and the implications of gene patenting. Following student presentations on these topics (week 14), the course will conclude with a discussion of the issues of culture and policy relevant to the advances in genetics and neuroscience and the future of ethical issues relevant to these advances.
III. Rationale for giving the course:

This course is designed to familiarize students with both the scientific and ethical issues that have emerged as a consequence of advances in the study of the genetic and neurobiological basis of behavior, psychological functioning, and disease risk. The first part of the course will provide students with an overview of the basic principles of behavioral genetics and behavioral neuroscience as well as both the historical and modern approaches to the question of biological determinism and free will. This background will provide students with the foundations to understand the ethical/legal/social issues to be discussed in subsequent weeks. The overall goal of the course is to encourage broader thinking regarding the implications of science for society and the way in which biological approaches to the study of health and behavior shape our decision making processes. The seminars will be designed to highlight these implications and to encourage students to further explore their specific area of interest relevant to the course by choosing a topic and type of article for presentation and essay writing.

Student presentations and discussions will be aimed to foster critical evaluation of primary research literature, while students will also be required to write a term paper in the form of a review article, for which they will be asked to summarize the current state of knowledge and research on a particular topic. Overall, this course is designed to provide a foundation for advanced study in biomedical and neuroethics and to expand on training in psychology, psychiatry, and neuroscience to incorporate a broader societal framework to these fields of study.


PSYC G4495 is an advanced seminar, designed particularly for graduate students, for advanced undergraduates who are majoring in Psychology or in Neuroscience and Behavior, and for students participating in the Psychology Postbac Certificate Program. These students will have priority in registration, followed by junior majors followed by non-majors.

The seminar will be well suited to students who have completed two or more lecture courses beyond W1001, such as W1010 (Mind, Brain, and Behavior), W2215 (Cognition and the Brain), W2450 (Behavioral Neuroscience), or W2480 (Developing Brain). It will help ameliorate a serious shortage of advanced seminars giving students opportunities to develop their oral and written presentation skills.

It fulfills the following degree requirements:

- For Psychology Graduate Students, PSYC G4495 will apply toward the “two seriously graded seminars” requirement of the Master’s degree.
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• For the Psychology major or concentration in the College and in G. S., for the Psychology minor in Engineering, and for the Psychology Postbac Certificate, G4495 meets the Group II (Psychobiology and Neuroscience) distribution requirement.

• For the Neuroscience and Behavior joint major, G4495 will fulfill the 5th Psychology requirement: “one advanced psychology seminar from a list approved by the Psychology Department advisor to the program.”

• For non-majors in the College and GS, G4495 – by virtue of its numbering in the 4400’s--will count as one term of the natural science requirement, provided that students obtain the necessary permission and have taken the prerequisite psychology courses. Graduate students, and students who are majoring in Psychology or in Neuroscience and Behavior, and postbac certificate students will have priority over students who are taking the course for the science requirement. For this reason, as well as because of the course prerequisites, we anticipate the course will rarely be used for the science requirement.

• For the Psychology Postbac certificate, PSYC G4495 will fulfill the advanced seminar requirement.

• For the Barnard Psychology major, PSYC G4495 will fulfill the senior seminar requirement.

IV. Weekly outline of topics and readings [subject to revision]:

Week 1
Introduction and Overview: What are the ethical, legal, and social implications of genetics and neuroscience research?
-discussion of topics and course requirements

READINGS:


Week 2
From Genes to Brains to Behavior
- overview of the basic principles of genetics and neuroscience and the approaches used to study the biological basis of behavior
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READINGS:


Week 3
Philosophical Perspectives on the Mind-Brain-Genes Relationship
-discussion of determinism vs. free will

READINGS:


Week 4
Consciousness, Neural Activity, & Genes
-modern approaches to linking the mind/perception to biological factors such as gene networks and neuronal activation

READINGS:


### PRELIMINARY SYLLABUS

**Week 5**  
Class Discussion and Presentation of Vignettes: How does genetic and neurobiological information shape our decisions?

**Week 6**  
Reproductive Choices: Ethics of Using Genetic Information

**READINGS:**


**Week 7**  
Discrimination on the Basis of Genetic Information

**READINGS:**


**Week 8**  
Journal article presentations/review session  
-4 students will critically evaluate a research article on a selected topic covered in weeks 6-7; every presentation will be followed by class discussion.

**Week 9**  
Legal Responsibility: Genetic and neurobiological variation and criminality

**READINGS:**


**Week 10**

**Neuromarketing: Can and/or should we use brain imaging data to determine consumer preferences?**

**READINGS:**


**Week 11**

**Journal article presentations/review session**

- 4 students will critically evaluate a research article on a selected topic covered in weeks 9-10; every presentation will be followed by class discussion.

**Week 12**

**Engineering Genomes and Brains: Can we and/or should we?**

**READINGS:**


**Week 13**

**Owning the Genome: Patenting DNA**

**READINGS:**
PRELIMINARY SYLLABUS


Week 14  Journal article presentations; Cultural Issues, Policy Implications & Future Directions
-4 students will critically evaluate a research article on a selected topic covered in weeks 12-13; every presentation will be followed by class discussion.


V. Course requirements and grading [subject to revision]:

Oral Presentations and Essay:
Students will be expected to give a presentation and write a paper on a single subject chosen from a list of topics covered in the class. Three separate sessions will be devoted to the student presentations (4 presentations/session), in which each student will be given 20 minutes to present followed by 5-10 min for questions and discussion. Presentations should focus on one to two recently published research articles in student’s area of interest, and should include: introduction to the research area, discussion of methods, results and conclusions of each paper, as well as future directions. Students not presenting will be expected to read the papers before coming to the class and to participate in discussions following presentations. Throughout the course, students will also be expected to participate in class discussions that will follow the overview lectures given by the instructor. The 10-page term paper will be due at the end of the course, and should be written in the style of a review article that summarizes the current state of knowledge and research in the student's area of interest.

Course grades will be based on: class attendance and participation (30%), oral presentation (30%), and the term paper (40%).