PSYC4570: Behavioral Genetics
Syllabus Spring 2017

Lecture Time: M, Th 11:45 – 1:25 PM
Lecture Location: Shillman Hall 220

Instructor Information:
Dr. Jennifer Ingemi
Email: j.ingemi@northeastern.edu
Office Location: 380 Nightingale Hall, dial ext. 6510 to be let in
Office Hours: M, Th 2 - 4 PM or by appointment

Course Description:
Behavioral Genetics is considered to lie at the intersection of Psychology and Genetics. The overall aim of this course is to guide you in the exploration of the genetic basis of behavior. This course will hone and develop a stronger foundation in the principles of Mendelian, population, quantitative genetics and evolution while exploring the genetic basis for, sleep, social behavior, responses to environmental stimuli, learning, memory, addiction, and the etiology of neuropsychiatric disorders. Additionally, this course approaches topics in Behavioral Genetics through discussion of current techniques and critical thinking about how genes that control behavior are discovered. I hope that by the end of this course you will discover that Behavioral Genetics is a dynamic field with plenty of possibility.

Prerequisites: PSYC 3458 and BIOL 2301 + 2302.

Course Objectives:

1. Strengthen your working knowledge of the mechanisms and principles underlying Mendelian and population genetics.
2. Gain an appreciation for the diversity and the complexity of the genetic interactions that shape behavioral outputs.
3. Refine your ability to think and write critically, design experiments to answer current questions in the field of behavioral genetics and use these skills to evaluate primary scientific literature in the field.

Learning Outcomes:

By the end of the course students will be able to:

1. Explain the core principles of Mendelian, population and quantitative genetics, in relation to the study of neuro-behavioral phenotypes, characteristics and traits.
2. Describe hereditary mechanisms and processes relevant for the nervous system and behavior.
3. Outline and describe a set of experiments necessary to identify genes that control behavior.
4. Explain how the modern molecular biology is advancing our understanding of genetics and neuro-behavioral sciences.

5. Evaluate, in writing, current theories and relevant scientific research on how genes influence sleep, social behavior, responses to environmental stimuli, learning, memory, addiction, and the etiology of neuropsychiatric disorders

Course Materials:


Additional readings from primary literature, supplemental handouts, videos, lecture slides and detailed assignment information can be found on the Blackboard site associated with this course. It will be your responsibility to check Blackboard often.

Top Hat Subscription (Required): A subscription to Top Hat will be required. Please visit [www.tophat.com](http://www.tophat.com) to signup; subscriptions are $24/semester or $72 for a 5 year subscription. You will receive an invitation with a 6-digit join code at the beginning of the semester.

Course Format:

Although this course is based on a traditional lecture and discussion, it will challenge you to think beyond the “memorize and regurgitate” learning style. You will be asked to integrate basic concepts in genetics to discuss how genes influence behavior and to think critically about how these genetic factors impact our lives. Together, we will explore applications and uses for new techniques and discuss scientific literature which will help you become more familiar with the scientific process. The ability to analyze literature and communicate your ideas effectively is critical for a scientist no matter what career path you choose. I hope that by challenging you to read, write and think critically that you will gain a solid base for developing these skills so that you can succeed as a scientist for the rest of your career at the level college and beyond.

To that end, portions of the course will rely on your participation in class, so please come prepared to participate by keeping up with the assigned readings for each lecture. I encourage everyone to participate in the discussion while being respectful to your peers ideas and questions. If, at any time, we are covering a topic that is relevant or related to your co-op experience (or one you are planning to do), please share your experience and/or insight with the class.

Lecture slides and corresponding textbook page references will be posted on Blackboard by 10 AM before class to help you with note taking. I will record my lectures via Tegrity (see “Tegrity Classes” on Blackboard) and make them available to you for your reference when studying or in the case that you miss class. This is NOT and online course, so watching recorded lectures in lieu of attending class on a regular basis is not advised. Unexpected computer issues might arise, and I cannot guarantee that each lecture will be recorded. If you miss class, Blackboard is
your greatest resource to finding out what you missed and how you should prepare for the next class.

Getting Help:

Students who need additional help with the course should see the instructor as soon as possible. I am available during office hours or by appointment to answer questions or provide extra help in person. I am also happy to answer questions via email and will respond within 24 hours of receipt of your message. Until you receive a response from me, assume I have not received your email. Peer tutoring is also available through the Peer Tutoring Program (http://www.northeastern.edu/csastutoring/).

Do NOT wait until the end of the semester to seek additional help.

Course Agenda: Below is a list of the topics we will hopefully cover and dates for exams, quizzes and assignments that will occur during the semester. Additional readings for in class discussion will be assigned to you during the semester. These assignments will be announced in class and the materials posted to Blackboard in advance.

In the event there is a class cancellation, all due dates (exams, quizzes, homework, readings, etc.) will be shifted to the next class period.
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<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Chapters/Readings</th>
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<tbody>
<tr>
<td>1</td>
<td>Jan. 9 &amp; 12&lt;br&gt;Introduction to Behavioral Genetics/Review of Nervous system communication and organization</td>
<td>Chapter 1</td>
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<td>Mutagenesis, Transgenisis and Genomic Approaches I</td>
<td>Chapters 2, 9</td>
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<td>Jan. 16: No Class – Martin Luther King Day</td>
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<td>Mutagenesis, Transgenisis and Genomic Approaches II</td>
<td>Chapters 2, 10</td>
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<td>3</td>
<td>Jan. 23 &amp; 26&lt;br&gt;Review of Mendelian Genetics/Basic Genetic Principals</td>
<td>Chapter 3</td>
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<td>4</td>
<td>Jan. 30 &amp; Feb. 2&lt;br&gt;Genetics of Sensory Systems: Taste</td>
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<td>Feb 2. - Journal Club Discussion Questions 1: Genetics of Taste</td>
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<td>Complex Traits and QTL Mapping</td>
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<td>5</td>
<td>Feb. 6 &amp; 9&lt;br&gt;Population Genetics and Heredity</td>
<td>Chapters 5, 7 and 8</td>
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<td>Feb. 9 – EXAM I</td>
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<td>6</td>
<td>Feb. 13 &amp; 16&lt;br&gt;Evolution of Behavior and the Interplay between Genes and the Environment</td>
<td>Chapters 6, 8, 20</td>
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<td>Genetics of Social Interactions: Courtship and Mating</td>
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<td>9</td>
<td>March 6 &amp; 9</td>
<td>March 6: No Class – Spring Break</td>
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<td>March 9: No Class – Spring Break</td>
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<td>March 16 - Journal Discussion Questions 2: Memory Consolidation</td>
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<td>Cognitive Abilities and Primary Cognitive Disorders</td>
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<td>11</td>
<td>March 20 &amp; 23</td>
<td>March 20 – EXAM II</td>
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<td>Disorders of Mood, Anxiety and Personality</td>
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<td>Genetics of Addiction: Drugs of Abuse</td>
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<td>13</td>
<td>April 3 &amp; 6</td>
<td>Genetics of Addiction: Alcoholism and Smoking</td>
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<td>Neurogenetics of Sleep and Activity</td>
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<td>April 13 - Journal Club Discussion Questions 3: Alcoholism and Sleep</td>
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<td>Career Opportunities and The Future of Behavioral Genetics</td>
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Grading and Evaluation:

Performance in the course will be graded according to the breakdown listed below.

Exams I-III: 65%
   Exam I: 20%, Thursday, February 9
   Exam II: 20%, Monday, March 20
   Exam III: 25%, during finals week date TBD

Quizzes: 20%

Journal Club Discussion Questions: 10%

In-Class Discussions and Top Hat Questions: 5%

Exams: Throughout the course there will be three, closed-book, closed note, unit exams (this includes your final exam). Each exam will cover primarily the material that is covered in that unit. However, knowledge of fundamental concepts covered earlier in the semester will be assumed as we progress through more advanced topics. In total, exams account for 65% of your final course grade

Exams will consist of:
   o Multiple choice
   o Matching
   o Problem solving
   o Open response, critical thinking questions

Final Examination:

Multiple-choice questions on your final exam will be focused on content from the last unit (non-cumulative), however open response questions will be cumulative in regards to the material we covered throughout the semester that focuses on genetics techniques which, we will call our “genetics toolkit”.

The final exam schedule is announced by the University well in advance of finals. Do not purchase airplane tickets, etc. until you know the date of your final exams including this course. If you find that you have a scheduling conflict between the final for this course and another course, it is your responsibility to complete and submit the final exam conflict form available through the Registrar’s Office online at URL: http://www.northeastern.edu/registrar/form-finex-conflict.pdf
**Quizzes:** There will be three quizzes throughout the semester. The purpose of the quizzes is to encourage you to review your lecture notes and study, as well as to monitor the effectiveness of the lectures and understanding of methods discussed in class. They will be given at the beginning of the class period and should take no more than 30 minutes to complete and consist of multiple choice, short answer and/or fill in the blank. They will account for 20% of your final course grade.

- Quiz 1: Thursday, January 26th
- Quiz 2: Thursday, March 2nd
- Quiz 3: Thursday, April 6th

**Exam and Quiz Make Up Policy:**
Make up exams and quizzes can be scheduled should you have an unavoidable health or personal emergency. Only **ONE** make up exam will be allowed per student for the semester. Please contact me as soon as possible if you have a conflict with a quiz or exam so we can make the appropriate considerations.

**Journal Club Discussion Questions:** During the semester you will be assigned articles from primary literature to read as a supplement to our lectures and textbook reading assignments. In addition to reading these articles and coming to class prepared for discussion, you will have to answer several discussion questions (1-2 paragraphs), which will encourage you to think critically about the article and evaluate it scientifically. You will submit your answers to the discussion questions to me on the assigned date for grading and we will discuss these points in as a group in class. These written assignments will account for 10% (in total) of your final grade. Late discussion questions will be accepted, with a deduction of 1 point for each day after the due date the assignment is late. Discussion Questions assigned during a particular unit will not be accepted after the exam for that unit, there will be no make-up discussion questions for missed assignments. Further information and grading rubric can be found in the assignments folder on Blackboard.

**In-Class Discussions and Top Hat:** Throughout the semester we will incorporate active learning sessions to discuss topics at hand or work on questions posed to the class. To make lectures more engaging and to encourage participation and attendance, interactive questions will be posted to Top Hat which you will answer on your smart phone, laptop or tablet during each class. Questions will be weighted 50% for accuracy and 50% for participation; assigned discussions will be weighted for participation only. Questions and discussions will account for 5% of your final course grade. Classroom questions can be completed only during lecture and there will be **no make-ups** for missed classes.
Grades:

Grades will be on the ABCDF scale with +/- grades. It is anticipated that letter grades for this course will be assigned according to the following scale:

A: 93-100%
A-: 90-92%
B+: 87-89%
B: 83-86%
B-: 80-82%
C+: 77-79%
C: 73-76%
C-: 70-72%
D+: 67-69%
D: 63-66%
D-: 60-62%
F: <60%

I reserve the right to lower these grade cutoffs, but they will not be raised. If the final, overall class average (not the average for one exam or assignment) should fall below 75%, the instructor reserves the right to scale the final grades to bring the class average up to 75%. NO negative scaling will be done if the class average is above 75%. There are no individual extra credit opportunities, but students who participate in class may find their final grade on the favorable side of a borderline situation.

Students with Disabilities:
If you are registered with the Disability Resources Center, please see the instructor to discuss the academic accommodations you may need. If you feel you need academic accommodations, but are not registered please contact The Disability Resources Center located in 20 Dodge Hall, or at (617) 373-2675.

Academic Integrity and violations thereof:
We have an uncompromising commitment to academic honesty. All members of the University community have the responsibility to become familiar with University’s academic integrity policy which can be found here: http://www.northeastern.edu/osccr/academic-integrity-policy/.

In brief, academic dishonesty is a very serious offense, recognized by the students themselves in the Academic Integrity Policy, and renders the offender liable to disciplinary action. Students caught violating the academic integrity policy will be penalized according to the severity of the offense. Possible penalties range from grade reduction on the particular assignment/exam to grade reduction or failure for the entire course.
This course follows the College of Science Academic Course Policies which are viewable at this link: http://www.northeastern.edu/cos/wp-content/uploads/2014/11/Northeastern-COS-Policies-Template.pdf

This syllabus is subject to change, with notification.