Course Description
In this course, we will explore the biological processes underlying sex differences in anatomy, physiology, and behavior in many species. In the first section of the class, we will explore evolutionary and ecological explanations for sex and sex differences: Why did sex evolve? What evolutionary mechanisms lead to sex differences? How does the environment influence sexual differentiation? In the second section of the class, we will explore genetic, developmental, and physiological explanations: What role do hormones play in sexual differentiation? In many species, adult individuals change sex – how does this happen? Are there sex differences in the brain, and if so, how are they related to sex differences in behavior? In the third section of the class, we will explore human sex differences. How do we evaluate biological hypotheses about human sex differences? What are the differences between sex and gender? Is there a biological basis for gender identity?

Objectives
1) Understand i) how natural and sexual selection influence evolution and ii) the evolutionary theories for the origin of sex and sex differences
2) Appreciate how genes, physiology, and the environment influence the expression of sexually dimorphic traits
3) Become familiar with the scientific method and how it can be used to study sex differences
4) Examine how the brain contributes to sexually dimorphic behavior
5) Gain experience interpreting primary literature and designing original experiments

Attendance and Late Work
Attendance is critical to your success in this course. Class meetings will often include activities and discussions that I hope will increase your learning and engagement with the material.

My door is always open - let me know if you are struggling with content or upcoming deadlines. Please discuss extensions or accommodations with me before the due date. Extensions or accommodations requested after the due date must have the support of your student dean. In absence of an extension, assignments are penalized 5% for each day they are late.

Course Materials
All readings will be posted to Blackboard.

Assessment

Exams 500 pts
- Midterm 1: 150 points
- Midterm 2: 150 points
- Take-home final: 200 points

Paper Discussion 250 pts
- Article quizzes: 75 points
- Reading Reactions: 75 points
- Article critique paper: 100 points

Experimental Design Assignment 200 pts
- Topic & Outline: 50 points
- Presentation: 50 points
- Written Proposal: 100 points

Class Preparation and Participation 50 pts

TOTAL 1000 pts
Course Components

Exams: 50%
There will be two in-class midterms (both worth 150 points) and a comprehensive take-home final (200 points).

Paper Discussion and Literature Critique: 25%
We will discuss articles from the primary literature during five class periods. To prepare for our discussions, you will read the assigned article and post one discussion question to Blackboard by 10pm on the day before the discussion. These “Reading Reactions” are each worth 15 points. Half credit for Reading Reactions posted after 10pm. See Blackboard for details and tips. There will be a short quiz on the article at the beginning of class. Each quiz is worth 15 points.

You will select one of the articles that we read in class and write a short paper that critically evaluates the article. Your paper should distill the main points from the article and evaluate it in a meaningful way. Excluding the bibliography, the paper has a strict 1000 word maximum. Your article critique must be turned in by 11/20, but you may turn it in earlier. See Blackboard for details.

Experimental Design Assignment 20%
Throughout the semester you will research a topic related to the course that is of interest to you. Your final project will be a paper and oral presentation in which you propose a hypothetical experiment (or series of experiments) that address a specific question of your choosing. There are several deadlines throughout the semester, including an initial topic description, peer-reviewed outline, and an in-class oral presentation. See Blackboard for details.

Experimental Proposal Due Dates

10/25 Topic Description
11/27 Outline
Peer Review
12/6 Practice Presentation
12/17 Final In-class Presentation
Written Proposal Due

Class Preparation and Participation: 5%
Ask questions! Be curious! Your thoughts on lecture and the readings will be the starting point for our discussions.

I will occasionally collect short in-class assignments that will be graded according to completion and effort. These assignments, as well as your general class participation, will count towards “participation and preparation.”
**General Course Policies**

If you know that you will miss a class due to a Bowdoin-sponsored activity or a religious obligation, please let me know by September 15 and I will make all possible accommodations.

My door is always open - let me know if you are struggling with content or upcoming deadlines. Please discuss extensions or accommodations with me before the due date. Extensions or accommodations requested after the due date must have the support of your student dean. If you are not in class when an assignment is due, be sure to get me a hard copy or an electronic copy of the assignment by the due date and time. In absence of an extension, assignments are penalized 5% for each day they are late.

Blackboard. All relevant course materials (up-to-date reading schedule, lecture notes, assignment details, grades) will be posted to the Blackboard. Please frequently check Blackboard for new information.

Email. Email is the best way to schedule a meeting with me or to ask simple questions. In general, I will not grant extensions or answer complex content questions via email. Please come to office hours or schedule a meeting with me to discuss course content or to request an extension.

Honor Code. You are responsible for reading, understanding, and following the Bowdoin Academic Honor Code as printed in your Student Handbook (http://www.bowdoin.edu/studentaffairs/student-handbook/college-policies/). You may work on assignments with classmates, but you must turn in your own original work.

Although I will try to minimize changes as much as possible, I may need to make adjustments to the lecture and reading schedule, assignments, grading policies, etc., during the semester. All changes will be announced in class, posted to Blackboard, and/or emailed.
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<thead>
<tr>
<th>Week - Date</th>
<th>Topic</th>
<th>Reading</th>
<th>Important dates</th>
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<tbody>
<tr>
<td>Function</td>
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<tr>
<td>Th 8/30</td>
<td>Introduction to Sex Differences</td>
<td>McCarthy, 2012; Berry &amp; Zucker, 2011</td>
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<tr>
<td>Tu 9/4</td>
<td>Levels of analysis / Evolution</td>
<td>Futuyma &amp; Kirkpatrik, Ch 3</td>
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<td>Th 9/6</td>
<td>Why Sex?</td>
<td>Futuyma &amp; Kirkpatrik, Ch 10 p263 – 268</td>
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<td>Tu 9/11</td>
<td>Mating Systems</td>
<td>Rubenstein &amp; Alcock, Ch 10 (skim)</td>
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<td>Th 9/13</td>
<td>Introduction to Sexual Selection</td>
<td>PAPER DISCUSSION – Barske et al., 2011</td>
<td>Paper Quiz</td>
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<tr>
<td>Tu 9/18</td>
<td>Sexual Selection I – Intrasexual</td>
<td>Rubenstein &amp; Alcock, Ch 9, p313 – 328</td>
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<tr>
<td>Th 9/20</td>
<td>Sexual Selection II – Reproductive polymorphisms</td>
<td>Rubenstein &amp; Alcock, Ch 9, p313 – 328</td>
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<td>Tu 9/25</td>
<td>Sexual Selection III – Interssexual</td>
<td>Rubenstein &amp; Alcock, Ch 8, p269 – 278 Rubenstein &amp; Alcock, Ch 9, p328 – 350</td>
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<td>Th 9/27</td>
<td>Sexual Conflict</td>
<td>PAPER DISCUSSION – Brennen et al., 2007</td>
<td>Paper Quiz</td>
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<td>Tu 10/2</td>
<td>Flexible strategies</td>
<td>Forsgren et al., 2004; Gwynne &amp; Simmons, 1990</td>
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<td>Th 10/4</td>
<td>EXAM 1</td>
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<td>Mechanism</td>
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<td>Tu 10/9</td>
<td>No Class – Fall Break</td>
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<td>Th 10/11</td>
<td>Hormones and the Brain</td>
<td>Watson &amp; Breedlove, Ch 8 p210 – 225</td>
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<td>Tu 10/16</td>
<td>Sex Differences in Physiology</td>
<td>PAPER DISCUSSION – Beiko et al., 2004</td>
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<td>Tu 10/23</td>
<td>Sexual Differentiation II – organization &amp; activational effects</td>
<td>Arnold, 2009</td>
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<td>Th 10/25</td>
<td>Sexual Differentiation III – temperature / sequential hermaphroditism</td>
<td>Todd et al., 2016</td>
<td>Topic Due</td>
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<td>Tu 10/30</td>
<td>Changing Sex</td>
<td>PAPER DISCUSSION – Black et al., 2005</td>
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<td>Th 11/1</td>
<td>Sexual Differentiation IV – environmental effects</td>
<td>Nelson &amp; Kriegsfled Ch 3, p130 –139</td>
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<td>Tu 11/6</td>
<td>Epigenetics</td>
<td>McCarthy &amp; Nugent 2015; Cameron et al 2008</td>
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<td>Th 11/8</td>
<td>Parental Effects</td>
<td>PAPER DISCUSSION</td>
<td>Paper Quiz</td>
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<td>Tu 11/13</td>
<td>EXAM 2</td>
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<td>Biological Basis of Human Sex/Gender Differences</td>
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<td>Th 11/15</td>
<td>Intro to Human Sex Differences</td>
<td>Nelson &amp; Kriegsfled, Ch 4, p170 – 201 Fine, Ch 2 – 3</td>
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<td>Tu 11/20</td>
<td>TBD</td>
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<td>Critique Due</td>
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<td>Th 11/22</td>
<td>No Class – Thanksgiving Break</td>
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<td>Tu 11/27</td>
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<td>Proposal Outline</td>
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<td>Th 12/6</td>
<td>Proposal Presentation Practice</td>
<td>PRACTICE PRESENTATIONS</td>
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<td>Final Week</td>
<td>Take home Exam due: 12/17, 8:30</td>
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<td>In-Class Presentations: 12/17, 8:30 – 11:30</td>
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