Course Format

Throughout the course, we will seek to understand how the force of natural selection might have led to both hope and religious faith. What were the selective advantages to our ancestors and what, if any, data support these contentions. The course, in short, explores the biological bases for qualities thought to be uniquely human: our capacity for hope and our relationship to a supernatural deity.
Lecture: M, W, F 10:30-11:18
Recitation: T or R 10:30-11:18

**GEC Objectives:** Courses in natural sciences foster an understanding of the principles, theories and methods of modern science, the relationship between science and technology, and the effects of science and technology on the environment.

**Learning Objectives and How They Will Be Met:**

1. **Students will understand the basic facts, principles, theories and methods of modern science as they relate to the biology of hope and belief.**

   This course is structured around two themes that are pivotal to modern biology. The first of these themes is that the force of natural selection has played a key role in producing the capacity for hope in humans as well as the human desire to believe in a supernatural deity. Each lecture explicates the adaptive significance of these phenomena and the evidence we have to support the claim that these behaviors developed as a consequence of natural selection. The second theme is that, if these qualities are the result of evolutionary forces, then it should be possible to identify the underlying physiological and biochemical mechanisms for them. In the course of making these arguments, students will be exposed to the facts, principles and theories of modern evolutionary theory as well as modern cell theory, physiology and neurochemistry.

2. **Students will learn key events in the history of science;**

   We will trace evolutionary theory from the time of Darwin to the present in an effort to understand how natural selection can be adduced to explain hope and belief. In so doing, students will understand how the theory of natural selection unifies key ideas in biology. In addition, students will learn about the nature of science, how evidence is evaluated and how critical experiments are designed. For instance, students will learn that indirect observation and experimentation valid ways of doing science as are making and testing predictions from evolutionary theory.

3. **Students will provide examples of the inter-dependence of scientific and technological developments;**

   Students will learn about how neurological activity can be assessed and interpreted. Students will learn about current brain scan technologies (eg. fMRI, PET, EEG etc.) and how the development of these technologies have facilitated our ability to measure subjective characteristics such as hope and belief. We will also discuss the limitations of these technologies and future directions in technology.
4. **Students will discuss social and philosophical implications of scientific discoveries and understand the potential of science and technology to address the problems of the contemporary world.**

Over the 10 week quarter, we will have many opportunities to explore the social and philosophical implications raised in the course. For instance, how should our capacity for hope be incorporated into end-of-life treatment decisions? If nonhuman animals have a capacity for hope, should that affect how we treat them? Can we ethically use brain-damaged people as guinea pigs for understanding how the brain works? If we can understand belief in God neurologically, does this diminish the spirituality of the religious experience? These issues will be covered both in the lecture and recitation sections.

**Prerequisites:** None

**GEC Category:** Natural Sciences Breadth

**Required Books:**


<table>
<thead>
<tr>
<th>Lecture</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>Course introduction and administrivia</td>
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<tr>
<td>2</td>
<td>What is hope: several views from history, literature and science</td>
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<td>3</td>
<td>Brain architecture and anatomy of the nervous system</td>
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4 How neurons communicate

5 Neurotransmitters and chemically-induced moods

6 The biochemistry of hope

7 Chemical signs of hopelessness; experiments with animals

8 Artificial hope: psychotropic drugs and how they work

9 Hope and the course of AIDS

10 Do animals have hope?

11 Evolutionary origins of hope

12 Hour exam 1

13 The selective advantage of hope

14 The organization of society and hope

15 Hope as a progenitor of religion

16 The evolution of the hominid brain

17 Tool use and the concept of causality among early hominids

18 How beliefs are formed in the brain; the neurological development of childhood beliefs

19 Resistance of belief to contrary evidence: what does the neurochemistry tell us?

20 Spiritual beliefs and the brain

21 The evolution of ritual in human societies

22 Mysticism and the biology of transcendence

23 Visual experiences and mental states: biological basis of Christic visions
24 Hour exam 2
25 Religion and evolutionary biology: what is the adaptive value of religion?
26 Is there a “God Gene”? What is the evidence?
27 Genetics and influences on religion and values
28 Neurobiological basis for consciousness and the soul
29 The curious case of music: a neurological portal to the divine?
30 Neurotheology: science or pseudoscience?

Students will enroll for one recitation section on either Tuesday or Thursday. Students will read assigned topics from the list below and discuss the selections in class.

**Recitation Reading List**  Readings that are not found in the required textbooks will be copied and provided to you in class. A quarter-long paper will be required in recitation. You will receive a separate handout in recitation giving details about what is required.

**Week 1  Hope from Several Points of View**


Excerpts:

As necessary as air. Pp. 13-37  
The past of an illusion pp. 39-80  
Room at the inn pp. 81-146


**Week 2 Structure of the Brain and Nervous System:**


**Week 3 A Society that Runs on Hope**


**Week 4 When Medicine Fails and Hope is all that’s left**


  Chapter 2: False Hope, True Hope, pp. 28-57  
  Chapter 3: The right to hope, pp. 58-81

**Week 5 Hope as a Selective Agent**


  Chapter 1: The View from Evolutionary Biology pp. 5-46  
  Chapter 6: Forgiveness as a Complex Adaptation, pp. 189-218

**Week 6 How Beliefs are Formed in the Brain**

Chapter 2: Belief, pp. 23-34
Chapter 3: Children, pp. 35-50
Chapter 4: Animals, pp. 51-68
Chapter 5: Tools, pp. 69-82

**Week 7  God on a PET Scan**


Chapter 7: Nuns, Buddhists and the Reality of Spiritual Beliefs, pp. 167-190

**Week 8 Mysticism**


Chapter 4: Myth-making, pp. 54-76
Chapter 5: Ritual: The Physical Manifestation of Meaning, pp. 77-97
Chapter 6: Mysticism: The Biology of Transcendence, pp 98-12

**Week 9  Evolutionary Biology of Belief**


Chapter 2: A View from the Social Sciences, pp. 47-85.

**Week 10  Origins of consciousness**


Chapter 2: How the Brain Makes the Mind, pp. 11-34
**Determination of Grades:**

You grade will be determined from the following distribution of points:

- Hour Exam 1—100 points
- Hour Exam 2—100 points
- Final Exam (comprehensive) 200 points
- Recitation Paper—100 points
- Recitation Participation—100 points

Total Course Points: 600

**Final Grades:** Your final grade will be based on the percentage of the 600 points that you earn during the course of the quarter, as indicated below:

- 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+   
- 60-66%      D    
- <59%        E

**Absences:** If you are too ill to take an exam, please contact your TA or Dr. Fisher within 24 hours of the class period in which the exam was taken. You must be seen by and receive written documentation from a professional health care practitioner on the day of the exam in order for a make up to be given. Other serious personal problems will be considered, in advance, on an individual basis. In all instances, documentation supporting the excused absence will be required.

**Academic Misconduct:** OSU has a strict code of academic that requires us to report any and all cases of suspected misconduct (e.g. cheating on an examination, plagiarism in written assignments, using an examination proxy, failure to follow course policies etc.) to the OSU Committee on Academic Misconduct for adjudication.

**Accommodation of Special Needs:** Any students registered with the Office of Disability Services needing accommodation should speak with Dr. Fisher regarding those needs. Please do this within the first two weeks of the quarter. Dr. Fisher will sign the ODS form.

**Sexual Harassment:** OSU considers sexual harassment offenses to be unacceptable behaviors that erodes the quality of the learning environment. Please report any concerns about questionable behavior to Dr. Fisher.