DRAFT

What is Life?
New York University
Freshman Seminar: FRSEM-UA 424
Professor Laura Franklin-Hall
Spring 2017

Class Time: Wednesday 3:30 – 6:00 pm (3rd floor seminar room, 5 Washington Place)
Office Hours: Thursday 3:30 – 5:00 pm and by appointment (407, 5 Washington Place)

Course Sketch

It seems that living things—such as people, penguins, algae, and bacteria—differ from mountains, crystals, and other inanimate matter in some fundamental way. But in what exactly does this difference consist? Are living things animated by souls that non-living things lack? Or do living things possess some life-bestowing metabolic property? In this course we will probe both contemporary and historical answers to the question “what is life?” through an examination of the work of philosophers, biologists, and writers of fiction. After considering the views of historical thinkers such as Aristotle, Descartes, and Coleridge, our investigation will be driven by examinations of the boundary between the living and the non-living. We will consider how life might have first evolved from inanimate matter, and learn about the search for life on other planets. What assumptions about the nature of life guide such searches? How different from terrestrial life might alien life be? Next, we will discuss scientific attempts to manufacture artificial life, both in the past and in our own time by synthetic biologists, engineers, and computer scientists. Finally, while reading Mary Shelley’s Frankenstein, Stanislaw Lem’s Solaris, among other works, we will reflect on how life—and artificial life in particular—has been portrayed in literature.

Reading Schedule

I. Introduction and Historical Foundations

Class 1, January 25

Anaximander, Empedocles and Aristotle on the Living and Non-Living

Reading:
De Anima (4th century b.c.e.), Book 2, chapters 2 - 4

II. Historical Controversies

Class 2, February 1

Is Life Just “Organized Dust”?

Reading:
Rene Descartes: life as the operation of a complex machine from the Treatise on Man [De homine] (1662)
Samuel Coleridge: all matter as living; life as ‘unity in multiplicity’
Hints Towards the Formation of a More Comprehensive Theory of Life (c. 1810)

Class 3, February 8

The Puzzle of Generation: Epigenesis vs. Preformationism

Reading:
Aristotle, from The Generation of Animals (4th century b.c.e.)
Charles Bonnet, from The Contemplation of Nature (1766)
J. F. Blumenbach, On Generation (1792)
III. Contemporary Foundations

Class 4, February 15

Evolutionary Theories

Reading:
- Erasmus Darwin, from *Zoonomia* (1803)
- Jean-Baptiste Lamarck, from *Zoological Philosophy* (1809)
- Charles Darwin, from *On the Origin of Species* (1859) chapters 3, 4, and 14

IV. Current Puzzles About Life

Class 5, February 22

The Origin of Life (short response paper due on either Feb 15 or Feb 22 readings)

Reading:
- *Seven clues to the origins of life* (1985) Cairns-Smith, A. G. Cambridge: Cambridge University Press. [entire]

Class 6, March 1

The Origin of Biological Altruism

Reading:
- *Unto Others*, Sober and Wilson [selection]

*March 3: Short response paper due*

Date TBD: Visit to the American Museum of Natural History

Class 7, March 8

The Contingency of Living Things

Reading:
- Gould "Wonderful Life"
- Simon Conway Morris "The Crucible of Creation"

March 15 – No Class – Spring Break

Class 8, March 22

Extraterrestrial Life

Reading:
- Peter Ward, *Rare Earth*, (2005) chapter 3
- *Solaris*, Stanislaw Lem (1960)

Class 9, March 29

Could a Planet or a Society be a Living Thing?

Reading:
- Sousa "Biological Individuality" (2005) - individual organisms
- Herbert Spencer "The Social Organism" (1860) - society as an organism
*March 31: Short response paper due*

Class 10, April 5

**Defining Life: A Philosophical Project**

*Reading:*
Dupre & O'Malley "What are living things?" (2008)
Bedau "What is Life?" (2008)

Class 11, April 12

**Manufacturing Life**

*Reading:*
Bedau "Artificial Life" (2003)

Class 12, April 19

**Artificial Life and Artificial Mind**

*Reading:*
John Searle, "Minds, Brains and Programs" (1980)

*April 21: Essay due*

Class 13, April 26

**Imagining Artificial Life**

*Reading:*
Frankenstein, Mary Shelley (1816)

Class 14, May 3

**The Value of Life**

*Reading:*
Principia Ethica (1903) G. E. Moore [selection]

*May 10: Take home essay exam due*

**Requirements**

1. *Attendance* in seminar is required. Although absences can be excused in special circumstances, no more than 2 absences can be excused in total. For each unexcused absence, your final grade will be penalized by 3%. Excuses will only be granted in special circumstances (religious commitment, serious illness, etc.)

2. *Class participation:* This is a small seminar, and we aim to have interesting discussions! It is critical that you be prepared for each class by completing the reading. A small portion of the grade will be dedicated to class participation. Full credit will be awarded to all students who show some desire to participate (normally by making at least one comment per class).
3. **Quizzes**: To provide a small incentive for completing the readings, there will be a short quiz (3 – 4 questions) at the beginning of most class meetings. The questions should be straightforward for anyone who has done the assigned reading. The two lowest quiz grades will be dropped.

4. **Descriptions of Required Written Work**

   **Short Response Papers (~750 words)**
   Three short response papers are required for this course. Such papers always address the readings for a single class and can address any of the three meetings prior to the due date (2/10, 3/3, 3/31). Each paper should have a thesis that it defends. Just what kind of piece is appropriate will depend in large part on the kind of reading under scrutiny. Here are some forms (neither exhaustive nor mutually exclusive) that these pieces might take:

   a. **The argumentative paper**
      This kind of paper calls into question some claim made in the reading. Perhaps the author’s conclusions don’t follow from the premises they’ve offered. Perhaps the author’s premises themselves are questionable. It is important to give reasons for whatever claims you make.

   b. **The clarificatory paper**
      This kind of paper will isolate some aspect of the reading which is difficult to understand or interpret and aim to clarify it. Perhaps there are two ways to understand some claim of the author. You might characterize these two and then suggest why one reading might be preferred to another. Or you might say why it matters which interpretation is correct.

   c. **The implication paper**
      This kind of paper characterizes some part of the reading and draws an implication from it. Perhaps this implication is simply non-obvious and thus worth spelling out. Or perhaps it speaks either for or against the correctness of your target’s thesis.

   Short response papers can always be re-submitted with revisions **within a week of their return**. If this is done, the final grade will be an average of the grade assigned to the first and second submissions.

   **Essays (1500-2000 words) – due 4/21**
   One longer essay is required in this course. It should address more than one assigned texts. It might be an expansion of a short response paper, but it need not be. I will distribute essay suggestions two weeks before the essay is due. You should meet with me separately—at least one week before the due date—if you’d like to design your own topic.

   **Final Essay Exam – due 5/10**
   There will be a final essay-based take-home exam for the course, distributed May 3th. It will query material from throughout the semester.

Basis for Grades:

- Participation: 5%
- Daily Quizzes: 10%
- Short response papers (10% each): 30% (~750 words)
- Essay: 25% (~2000 words)
- Final Essay Exam: 30%