Evolution is the central organizing concept in biology. It is integrated in our understanding of all aspects of biology including natural history, development and genetics, cell and molecular biology, ecology and microbiology. As famed biologist Theodosius Dobzhansky aptly stated, “Nothing in biology makes sense except in the light of evolution.”

This course introduces students to the development of evolutionary thought from Darwin's day to the present. What is evolution? What is an organism? What is a gene? This course explores these concepts, and the controversies that have surrounded them. It includes an introduction to new evolutionary research programs, contemporary Darwinian and non-Darwinian theory, changing concepts of the organism, and shifting concepts of the gene, that advance research today.

The lectures and text book take an historical approach designed to enhance students’ understanding of fundamental biological concepts. A central question motivating the course lectures is: Why did the history of biology and evolutionary thought unfold the way it did? The lectures and readings are divided into four parts. PART I, the emergence of evolutionary thinking, and issues about Darwinism in the 19th century; PART II, the rise of experimental biology, the development of Mendelian genetics, populations genetics, the Darwinian renaissance of the 1930s and 40s; Part III, the concepts of molecular biology, microbial evolution and the role of symbiosis in evolution.


A CD of all lectures is available at the Steacie library and at the York University Bookstore.

**Evaluation:** 3 Class Tests -short answer value-100%
**REMEDICATION ASSESSMENT.** Two best tests worth 40%; the remaining test worth 20%

**TEST information**
Students may see their tests during office hours within one week after notification of test results. Make-up tests will be held one week after the assigned test, only for students with medical notes.

Lectures

Part I


The Origin, pp. 1-6, 44-59
Revolution to Evolution
Lamarckian Myths
The Great Chain of Being
Disconnecting the Unity of Life
The Cuvier-Geoffroy Debate

September 11 The Origin of Species. Genesis, chapter 2,
The Origin “Struggle for Existence pp. 60-79
When Making Other Plans
Darwin’s Bible
The Beagle Voyage
Natural Selection and Natural Theology
Wallace’s Manuscript
Concepts of The Origin

September 16 Darwin’s Champions. Genesis, chapter 3
The Origin “Natural Selection,” 80-130
Man’s Place in Nature
Natural Theology and Agnosticism
Archetype and Idealism
Ontogeny and Phylogeny
Materialism for Mysticism

September 18 Darwinism and Socio-political Thought. Genesis, chapter 4
The Origin “Laws of Variation”, 131-170
Laissez-faire
War and Racism
Darwinism on the Left
Was Darwin a Social Darwinist?
Social theory in evolution
The Division of labor
Darwin and Malthus

September 23 Mutualism Genesis, Chapter 5
Anarchism
Between Individuals
Between Species
Natural Theology

September 25 Dissent from Darwin.  
*Genesis*, Chapter 6  

- Is the Earth Old Enough?
- Blending Heredity
- What is a Species?
- Speciation and Isolation
- Is Everything Adapted?
- Holes in the Record
- Neo-Lamarckism
- Orthogenesis
- Saltationism

September 30 holiday

October 2 Test 1

**Part II**

October 7 The Myth of the Cell Theory.  *Genesis*, Chapter 7  
- An Historical Paradox
- Cells from Cells
- More than Meets the Eye
- Vitalism, Materialism and Spontaneous Generation
- The Body Politic. *Genesis*, Chapter 8
- The Cell State
- Progress through Specialization
- The Dawn of Protistology
- A Cell is Not a Cell
- What’s in a Word
- Organisms Wi hin Organisms
- Weismannism

October 9 No Class. (Yom Kipur)

October 14 Evolving Embryology *Genesis*, Chapters 9 and 10  
- Technical Virtuosity
- The Organism as a Whole
- Epigenesis and Preformation
The Body Plan in the Egg
Maternal Inheritance
Cellular Differentiation
Cytoplasmic Evolution

October 16 Mendel Redux *Genesis*, Chapter 11
Mendel’s Laws
Neglect and Rediscovery
Why Multiple Meanings?
Genetics Versus Statisticians
Mendel Made Darwinian
Is the Scientific Paper Fiction?

October 21 Emerging Genetics *Genesis*, Chapter 12
The Field of Heredity
Genotype and Phenotype
Biology out of Balance
Are Genes Real?

October 23 Darwinian Renaissance *Genesis*, Chapter 13
Merging Mendelism
The Importance of Sex
Population Genetics
Random Drift and non-adaptive Change
The Species Problem
Microevolution as Macroevolution
Lessons of Synthesis

October 28 Review

**Part III**

October 30 Test 2

Nov. 4 Genetic Heresy and the Cold War *Genesis*, Chapter 15
Lysenkoism
Non-Darwinian Development
Plasmon to Plasmagenes
The Inheritance of Acquired Characteristics
University Politics
Morgan’s smile

Nov. 6 Conceiving a Master Molecule. *Genesis*, Chapter 16 Chapter 17
DNA Seemed too Simple
Transformation and Transduction
Chromatography
X-ray Crystallography
Digital DNA
Transcription and Translation
Turning Genes On and Off
The Classical Doctrines of Molecular Biology

Nov. 13 Beyond the Genome. *Genesis*, Complexity and the Human Genome
A Genomic Plan?
Confronting Old Dogmas
Cell Architecture and Spatial Information
Field Heredity
Epinucleic Inheritance

Nov. 18 Molecular Evolution and Microbial Phylogeny. *Genesis*, Chapter 18
Pre-Cambrian Explosion
Deep Phylogeny
A Code for Classification
A Trilogy of Life
Dissension and Disaffection
Horizontal Gene Transfer

Nov. 20 Symbiomics. *Genesis*, Chapter 19
Chimeras All
Developmental symbiosis
Symbiosis Silhouette
Towards a Unified Theory
Macroevolutionary Change

Nov. 25 The Evolution of Relationships. *Genesis*, Chapter 20, and review
The Self and the Group
The Organism as a Beehive
The Lessons of Sociobiology
About Just-so-Stories
Symbiotic Ties

Nov. 27 Test