

**WESTERN CULTURE: SCIENCE, TECHNOLOGY, PHILOSOPHY II
(THE MAKING OF MODERN SCIENCE)**

- I. Early Modern Science: The Mechanical Worldview, 1600-1800**
 - A. Introduction (Ja 19)**
 - B. Pioneers of Modern Scientific Method, 1600-1650 (Ja 21)**
 - C. The Newtonian Synthesis, 1650-1700**
 - 1. The Unification of Celestial and Terrestrial Mechanics (Ja 26)
 - 2. The Newtonian Worldview (Ja 28)
 - D. Toward a New Technology, 1300-1800**
 - 1. Clockwork and Pneumatics (Fe 2)
 - 2. The Steam Engine and the Industrial Revolution (Fe 4)
 - E. The Conservation Laws, 1650-1800**
 - 1. Conservation of Motion (Fe 9)
 - 2. Conservation of Mechanical Energy and Heat (Fe 11)
 - F. Science and Enlightenment Thought, 1700-1800 (Fe 16)**
- II. Modern Biological Science: Evolution, 1800-1870**
 - A. The Background to Darwin, 1800-1830**
 - 1. Natural History and the Species Problem (Fe 18)
 - 2. Evolutionary Theory ca. 1800: Jean Baptiste Lamarck (Fe 25)
 - 3. Geology, Paleontology, and Evolution (Mr 2)
 - B. Charles Darwin and Evolutionary Theory, 1830-1859**
 - 1. The Voyage of the Beagle and the Idea of Natural Selection (Mr 4)
 - 2. Introduction to The Origin of Species (Mr 16)
 - 3. New Twists on Old Ideas in Origin of Species (Mr 18)
 - C. Evidence and Reception, 1859-1870**
 - 1. Darwin's Evidence (Mr 25)
 - 2. The Reception of Darwinism (Mr 30)
- III. Modern Physical Science: Energy and Relativity, 1800-1920**
 - A. Toward the Energy Concept, 1800-1850**
 - 1. Romanticism and Electricity (Ap 1)
 - 2. Unification of Heat and Mechanical Energy (Ap 8)
 - B. The Energy Law and its Impact, 1850-1880**
 - 1. The Law of Conservation of Energy (Ap 13)
 - 2. Energy and Scientific Methodology (Ap 15)
 - C. The Relativistic Outlook, 1880-1905**
 - 1. Einstein's Starting Point (Ap 20)
 - 2. The Principle of Relativity (Ap 22)
 - 3. The Relativity of Simultaneity (Ap 27)
 - D. The Significance of Relativity, 1905-1920**
 - 1. Consequences and Impact of Special Relativity (Ap 29)
 - 2. General Relativity and Cosmology (My 4)
 - E. Conclusion: Einstein and the Twentieth Century (My 6)**

1st Midterm: Tues., Feb. 23, 3:30-5:00 p.m.
2nd Midterm: Tues., Apr. 6, 3:30-5:00 p.m.
Final Exam: Fri., May 14, 5:05 p.m.

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Required Texts:

1. Charles Darwin, Origin of Species, ed. J.W. Burrow
2. Rene Descartes, Discourse on Method, tr. L. J. Lafleur
3. Albert Einstein, Relativity: The Special and the General Theory
4. Banesh Hoffmann, Albert Einstein: Creator and Rebel
5. Arnold Pacey, The Maze of Ingenuity, 2nd. Ed.

Other Reading:

1. ILS/HIST SCI 202 Course Anthology (University Bookstore)

Selections:

I. Early Modern Science

Descartes, pp. 1-50
Pacey, Preface, Ch. 2 (to p. 45), 4, 6, 7
Course Anthology, I-V, VII (Sec A), VIIa, VIII

II. Modern Biological Science

Darwin, selections (see attached)
Course Anthology, IX

III. Modern Physical Science

Course Anthology, VI, VII (Sec B-D)
Pacey, pp. 230 (line 3) - 235 (line 19)
Einstein, Preface, Ch. 2-10, 18-20, 22, (23-24), 30-32
Hoffmann, Ch. 1-3, 5-8

Components of the Course Grade

	1st M'trm	2nd M'trm	Section	Final
Points	100	100	100	150
Percent	22.2	22.2	22.2	33.3

Attendance:

Attendance is required at all class sessions: 1) Attendance at discussion sections will be recorded and reflected in the section grade. 2) Although attendance at lectures will not normally be recorded, neither the assigned reading material nor any lecture notes will fill in reliably for a substantial number of missed lectures.

Charles Darwin, The Origin of Species, 1st ed., ed. J.W. Burrow
(1859; Harmondsworth: Penguin, 1968).

Introduction: entire, pp. 65-69.

Ch. 1: pp. 71-73 (end paragraph); 89 ("Selection") - 100.

Ch. 2: pp. 101-105 (end. paragraph); 107 (1st full paragraph) - 108 (through 1st full paragraph)

Ch. 3: entire, pp. 114-129.

Ch. 4: pp. 130-142 (to "Intercrossing"), 147 ("Circumstances") - 172. (Special attention to chart on 160-161, and discussion thereof.

Ch. 5: pp. 173-179 (to "Acclimatisation"); 203 (last paragraph) - 204.

Ch. 6: pp. 205-207 (end para.); 211 ("Origin") - 221 (end para.); 233 (2 full paragraphs).

Ch. 7: pp. 234 (entire); 243 ("Slave-making") - 247 (to "Cell-making"); 262 ("Summary") - 263.

Ch. 8: pp. 264-268 (end para.); 288 ("Summary") - 290.

Ch. 9: pp. 309 ("Sudden appearance") - 312 (to "Sudden appearance"); 315 (last para.) - 316.

Ch. 10: pp. 317 (to middle); 330 ("Affinities") - 343.

Ch. 11: pp. 344-357 (last full paragraph)

Ch. 12: pp. 378 - ("Inhabitants") - 396.

Ch. 13: pp. 397-399 (end. para.); 415 ("Morphology") - 417 (end. para.); 422 (1st full paragraph) - 434.

Ch. 14: entire, pp. 435-460.