

THE EVOLUTION CONTROVERSY

Course Number: BIO 314

Institution: University of Michigan, Flint

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Course Catalog Description:

An examination of the basis for the tensions in our society involving evolution and Christianity. Includes historical, philosophical, biblical, and scientific aspects of the controversy. A positive perspective is taken toward both science and religion, and possible ways of resolving the conflict are explored.

Prerequisites:

One course in natural science and one course in philosophy or religion; or consent of instructor.

Course Objectives

1. To understand the nature and interrelationship of science and religion.

There is probably no contemporary social issue that illustrates the nature of science and religion better than the evolution controversy. Philosophically, the issue concerns the realms and methods of scientific and religious inquiry, the meaning and development of scientific theories, the relationship of the supernatural and science, design and purpose within a world of chance, the problem of evil, and the relationship of the mind to the brain. With respect to Christian theology, it prompts an examination of the various literary forms and cultural contexts in the Bible, the interpretative approaches to the Bible, and the special uniqueness and value of human beings.

2. To consider ways in which the conflict over creation and evolution can be lessened.

The creation-evolution controversy is an important issue to understand in its own right. Confrontations over evolution and creation have had a profoundly negative impact within the field of public education and within individual families. Unfortunately, creation and evolution are frequently viewed as opposing concepts. Such conclusions are often derived more from emotional factors than from rational inquiry.

The course will logically evaluate specific philosophical and biblical issues that have been used to argue either that evolution is incompatible with Christianity or that the idea of a Creator is incompatible with science. Specific suggestions are made for the resolution of these issues.

3. To evaluate the scientific evidence used in support of evolution.

The theory of evolution is the result of efforts within a broad range of scientific studies. In particular, multiple subdisciplines within astronomy, physics, geology, chemistry, and biology have contributed numerous findings in support of cosmic evolution from the Big Bang to human origins. But, as with any complex theory, the lines of evidence for evolution vary in strength. The course will examine the scientific evidence for evolution, assess the relative strength of each argument, and evaluate the merits of the anti-evolutionary claims of special creationists.

Major Topics

Your assigned readings for the following lecture topics are compilations of excerpts to be described later. Supplementary reading selections are listed below under each topic.

I. Rise of Evolutionary Thought

The early Greek-Christian view regarded nature as being fundamentally static. The change to a dynamic view of nature is followed historically within the fields of astronomy, geology, and biology.

Bowler, P. J. *Evolution: The History of an Idea*, California, 1984.

Rudwick, Martin. *The Meaning of Fossils Episodes in the History of Palaeontology*, Scientific History, 1976.

II. Religious Response

The range of Christian reactions to evolution is presented from the publication of the *Origin* to the present day. Topics include the rise of Fundamentalism, the Scopes trial, and the modern anti-evolution movement.

Eve, R.A. and F.B. Harrold. *The Creationist Movement in Modern America*, Twayne, 1990.

Lindberg, D.C. and R.L. Numbers, eds. *God and Nature*, California, 1986

Livingstone, David N. *Darwin's Forgotten Defender's: The Encounter Between Evangelical Theology and Evolutionary Thought*, Eerdmans, 1987.

Numbers, Ronald L. *The Creationists*. Knopf, 1992.

III. Problem in Focus

Eight creation-evolution positions are described. The conflict over origins, which is driven primarily by the religious and secular extremes, causes great societal and personal harm. A strategy is described to defuse the conflict.

Barbour, Ian G. *Religion in an Age of Science*, Harper & Row, 1990. (Chapter 1, "Ways of Relating Science and Religion")

Bube, Richard. *Putting It All Together: Seven Patterns for Relating Science and the Christian Faith*, University Press of America, 1995.

Van Till, Howard et al. *Science Held Hostage: What's Wrong With Creation Science and Evolutionism*, InterVarsity, 1988.

IV. Clarification of Categories

The categories of creation and evolution are evaluated with respect to the categories of science and worldview (religion). Since the home bases of creation and evolution are in different categories, compatibility is theoretically possible.

Barbour, Ian G. *Religion in an Age of Science*, Harper & Row, 1990. (Chapter 2, "Models and Paradigms"; Chapter 3, "Similarities and Differences")

Polkinghorne, John. *Serious Talk: Science and Religion in Dialogue*, Trinity Press International, 1995.

Gould, Stephen J. "Nonoverlapping Magisteria." *Nat. Hist.* (March 1997) p. 53-62.

Grizzle, Raymond E. "A Conceptual Model Relating Theology and Science: The Creation/Evolution Controversy as an Example of How They Should Not Interact." *Perspectives in Science and Christian Faith* 45:4 (1993) p. 222-228.

Van Till, Howard J., et al. *Portraits of Creation*. (Chapter 5)

V. Science and the Supernatural

The position that naturalism is the philosophy of science is a secular distortion. A bias for the supernatural mode results from a religious distortion. Topics include methodological naturalism, God-of-the-Gaps, and intelligent-design theory.

Bube, Richard H. "The Failure of the God-of-the-Gaps." In *Horizons of Science: Christians Scholars Speak Out*, ed. Carl F.H. Henry. p. 21-35.

Davis, Edward B. "Christianity and Early Modern Science: Beyond War and Peace?" *Perspectives in Science and Christian Faith* 46:2 (1994) p. 133-135.

Edwards, Rem B. *Reason and Religion: An Introduction to the Philosophy of Religion*, Harcourt Brace Jovanovich, 1972. (Chapter 7, "Supernaturalism")

Polkinghorne, John. *Science and Providence: God's Interaction with the World*, New Science Library, 1989. (Chapter 4, "Miracles")

Polkinghorne, John. *Science and Creation: The Search for Understanding*, New Science Library, 1989. (Chapter 1, "Natural Theology")

VI. Design and Chance

The particulate design of William Paley is compared to a modern holistic design. The proximate chance of science, which is compatible with design, does not logically lead to the ultimate chance of philosophy. Christians who object to chance in evolution routinely accept chance within divine providence in genetics and history. Topics include the Anthropic Principle, quantum indeterminacy, and chaos theory.

Barbour, Ian G. "Creation and Cosmology" In *Cosmos as Creation*, Ted Peters, ed., Abingdon, 1989.

Davies, Paul. *The Mind of God: The Scientific Basis for a Rational World*, Simon & Schuster, 1992.
(Chapters 7 and 8)

MacKay, Donald M. *Science, Chance, and Providence*, Oxford, 1978.

Polkinghorne, John. *Beyond Science: The Wider Human Context*, Cambridge, 1996. (Chapter 6, "What Does It Mean?")

Polkinghorne, John. "Chaos Theory and Divine Action" In *Religion and Science*, W.M. Richardson & W.J. Wildman, eds., Routledge, 1996.

VII. Evolution and Evil

Some claim that the method of natural selection is too harsh for a good God to use in creation. The case is made that the problem associated with animal death and suffering is grossly exaggerated and that the remaining "evil" should be viewed by Christians with religious humility.

Emberger, Gary. "Theological and Scientific Explanations for the Origin and Purpose of Natural Evil" *Perspectives in Science and Christian Faith*. 46:3 (1994) p. 150-158.

Plantinga, Alvin C. *God, Freedom, and Evil*, Eerdmans, 1974.

Polkinghorne, John. *Science and Providence: God's Interaction with the World*, New Science Library, 1989. (Chapter 5, "Evil")

Wenham, J. W. *The Enigma of Evil: Can We Believe in the Goodness of God*, Academie, 1985.

VIII. Biblical Perspective

Young-earth creationists maintain that the first chapters of Genesis are written in the form of a historical narrative. Considerable textual evidence is presented to support a more figurative intent. Such an interpretation does not undermine Genesis 1-3 as being theologically foundational.

Hummel, Charles. *The Galileo Connection: Resolving Conflicts Between Science and the Bible*, InterVarsity, 1986. (Chapter 8, "Interpreting the Bible"; Chapter 10, "Genesis One: Origin of the Universe")

Kidner, Derek. *Genesis: An Introduction and Commentary*, InterVarsity, 1967.

Kline, Meredith G. "Space and Time in the Genesis Cosmogony." *Perspectives in Science and Christian Faith* 48:1 (1996) p. 2-15.

Hyers, Conrad. *The Meaning of Creation: Genesis and Modern Science*, John Knox Press, 1984.

Blocher, Henri. In *The Beginning: The Opening Chapters of Genesis*, InterVarsity, 1984.

IX. Human Nature

The view of man from the perspective of paleoanthropology and cognitive science is compared to the theological view. The most fundamental issues within the concept of mind/soul/spirit are placed outside of science. Various options for incorporating the biblical "Adam" within an evolutionary context are explored.

Cooper, John W. *Body, Soul, and Life Everlasting: Biblical Anthropology and the Monism-Dualism Debate*, Eerdmans, 1989.

Dobzhansky, Theodosius. *The Biology of Ultimate Concern*, Rapp and Whiting, 1967. (Chapter 3, "Evolution and Transcendence"; Chapter 4, "Self-Awareness and Death-Awareness")

Larick, Roy and R.L. Ciochon. "The African Emergence and Early Asian Dispersals of the Genus Homo" *American Scientist* 84. (Nov.-Dec. 1996) p. 538-552.

MacKay, Donald M. *Brains, Machines, and Persons*, Eerdmans, 1980.

Polkinghorne, John. *Beyond Science: The Wider Human Context*, Cambridge, 1996. (Chapter 5, "What Happened to the Human Mind?")

Schlegel, Richard. "The Return of Man in Quantum Physics" In *The Sciences and Theology in the Twentieth Century*, Peacocke, A.R., ed., Notre Dame, 1981.

X. Evolution as a Scientific Theory

Some claim that evolution is not scientific because it deals with the non-observed past or that it is nonfalsifiable. Others claim that evolution is merely a theory. The nature of scientific conclusions is examined.

Kitcher, Philip, ed. *Abusing Science: The Case Against Creationism*, MIT, 1982. (Chapter 2, "Believing Where We Cannot Prove")

Ruse, Michael, ed. *But Is It Science? The Philosophical Question in the Creation/Evolution Controversy*, Prometheus Books, 1988. (Part 4, "The Philosophical Aftermath")

Hutcheson, Peter. "Evolution and Testability" *Creation/Evolution* #18 (1986) p. 1-9.

XI. Cosmology

A likely cosmic journey is followed from 10⁻⁴³ seconds after the Big Bang to 10¹⁰⁰ years at the cosmic end. Topics include age determination, galaxy and star formation, star death, and the origin of the elements. Possible metaphysical inferences are discussed.

Barrow, John. *The Left Hand of Creation: the Origin and Evolution of the Expanding Universe*, Oxford, 1993

Davies, Paul. *The Edge of Infinity: Where the Universe Came From and Where It Will End*, Simon and Schuster, 1981.

Poundstone, William. *The Recursive Universe: Cosmic Complexity and the Limits of Scientific Knowledge*, William Morrow, 1985.

XII. Biopoesis and Possible Physical Constraints

The necessary steps and the accompanying evidence for a natural origin of life are evaluated. The claim that such a process would violate the second law of thermodynamics is critiqued.

Cairns-Smith, Alexander G. *Seven Clues to the Origin of Life: A Scientific Detective Story*, Cambridge, 1991.

Eigen, Manfred. *Steps Towards Life: A Perspective on Evolution*, Oxford, 1992.

Kauffman, Stuart A. *The Origins of Order: Self-Organization and Selection in Evolution*, Oxford, 1993.

Thaxton, Charles B., et al. *The Mystery of Life's Origin*, Philosophical Library, 1984.

XIII. Biological Analysis of Common Ancestry

The classic evidence from comparative anatomy is considered along with more modern studies involving chromosome and molecular characteristics. Topics include vestigial structures, the molecular clock, and pseudogenes.

Futuyma, Douglas J. *Science on Trial: The Case for Evolution*, Pantheon Books, 1983. (Chapter 3, "The Legacy of the Taxonomists")

Max, Edward E. "Plagiarized Errors and Molecular Genetics: Another Argument in the Evolution-Creation Controversy." *Creation/Evolution* #19 (1986) p. 34-47.

Selander, Robert K. et al, eds. *Evolution at the Molecular Level*, Sinauer Associates, 1991.

Yunis, Jorge J. "The Origin of Man: A Chromosomal Pictorial Legacy." *Science* 215(1982) p. 1525-1529.

XIV. Plate Tectonics

Evidence is presented historically that resulted in a recent dramatic paradigm shift in geological thought. This new understanding helped to explain various biogeographic anomalies.

Colbert, Edwin H. *Wandering Lands and Animals*, E.P. Dutton, 1973.

Erickson, Jon. *Plate Tectonics: Unraveling the Mysteries of the Earth*, Facts on File, 1992.

LeGrand, Homer E. *Drifting Continents and Shifting Theories*, Cambridge, 1988.

XV. Stratigraphy and Fossils

The geological column and its age determinations are described. Fossil distribution and transitional forms are evaluated with respect to common ancestry.

Elders, Wilfred A. "Bibliolatry in the Grand Canyon" *NCSE Reports* 18/4 (July/August 1995) p. 8-15.

Futuyma, Douglas J. *Science on Trial: The Case for Evolution*, Pantheon Books, 1983. (Chapter 4, "The Fossil Record")

McMenamin, Mark and Dianna McMenamin. *The Emergence of Animals: The Cambrian Breakthrough*, Columbia, 1990.

Prothero, Donald R. *Interpreting the Stratigraphic Record*, Freeman, 1990.

Schopf, J. William, ed. *Major Events in the History of Life*, Jones and Bartlett, 1992.

Young, Davis A. *Christianity and the Age of the Earth*, Zondervan, 1982.

XVI. Noah's Flood

Morris' claim for a catastrophic worldwide flood is critiqued from both a biblical and a scientific perspective. Various regional-flood scenarios are considered.

Moore, Robert A. "The Impossible Voyage of Noah's Ark" *Creation/Evolution* Entire Issue 11 (1983) p. 1-39. Various responses are in Issue 13.

Siemens, David F. "Some Relatively Non-Technical Problems with Flood Geology" *Perspectives in Science and Christian Faith* 44:3 (1992) p. 150-162.

Siemens, David F. "More Problems with Flood Geology" *Perspectives in Science and Christian Faith* 44:4 (1992) p. 228-235.

XVII. Evolutionary Mechanisms

Current mechanisms under consideration go beyond the typical mutation-selection processes of microevolution. Several macroevolutionary strategies are described.

Campbell, John and J.W Schopf, eds. *Creative Evolution?! ,* Jones and Bartlett, 1994.

Taylor, Gordon. *The Great Evolution Mystery,* Harper and Row, 1983.

Wesson, Robert G. *Beyond Natural Selection,* MIT, 1991.

XVIII. Practical Advice

Suggestions are made to churches on how they can loosen the anti-evolutionary knot. The two-model approach to public education is evaluated as being bad for both science and religion. Various positive approaches are presented for dealing with the question of origins in public schools.

McKown, Deleos B. "Creationism and the First Amendment" *Creation/Evolution* #7 (1982) p. 24-32.

Nelkin, Dorothy. *Science Textbook Controversies and the Politics of Equal Time,* Cambridge, MIT, 1977.

Course Structure

Class Sessions:

Class periods will primarily consist of lectures supplemented with various videos and projected slides. The lecture format should not be viewed as a hindrance to student participation. In fact, I want to encourage questions and discussion during the lecture period.

Texts:

Every previous time this course has been taught, two or more published textbooks have been required. But the course is so diverse that many topics have not been covered adequately by them and various subjects they have covered were not used in the course. The inadequacy and inefficiency of textbook use has been frustrating to me and, I am sure, to the students.

So this year a new approach is being tried. I am compiling excerpts from many publications that correspond to the topics in the course. These excerpts will be organized in the same structure as the course outline and will be placed on the student server for printing. Since the excerpts are being developed as the class progresses, you will be notified when each new installment is available. Please print and read them before the relevant lecture. Your patience and understanding are also requested since sometimes my schedule may permit only a short time period between the availability of the installment and the lecture itself. The excerpt packets will be placed in the ADAMS folder in the PROGDATA folder on the SAPP server.

Additional Resources:

The bibliographies of the excerpt packets include many references that are available in the UM-F Library. These references provide an ideal way to explore topics for general understanding or for specific writing projects.

Office Hours:

I have scheduled the hour after class for your use. This is a good time to ask questions, debate a particular point, share your personal experiences, or just socialize. This time belongs to you; take advantage of it! If this time is not suitable to you, I will gladly arrange a mutually convenient time.

Evaluation:

Exams:

Grades will be determined primarily by four exams. They will consist of fill-in-the-blank, true/false, multiple choice, short answer, and essay questions. There is no comprehensive final exam. Because of the broad range of topics in the course and the varied academic background of the students, the exams

will be weighted based on performance. Your worst exam will be weighted 0.5; your best exam will be weighted 2.0. This will compensate those who either have a particularly weak or strong background in one area. The weighting will be a benefit only to those who have a significant disparity in exam performance. The exam dates are tentatively

February 4 (topics I through V)

March 9 (topics VI through IX)

April 1 (topics X through XIV)

April 29 (topics XV through XVIII)

Papers:

Up to two optional papers may be written, and each must correspond to a different quarter of the course. (The quarters are represented by the exam coverage.) If your grade on the paper is high enough, it will improve your grade for that quarter. (It can never hurt your grade.) Your performance on a paper will improve your quarterly grade in the higher of the following two methods of calculation: a) paper grade averaged with the corresponding exam grade, or b) 0.5% added to the exam grade for every percent over 80% on the paper.

Topic selection should begin by your identification of areas of particular interest within the relevant quarters. The various excerpt compilations can aid this process not only in identifying subject areas but in identifying particular research references. Your topic areas may involve such approaches as a critique of a particular position, the elaboration of a particular issue, or a biographical or historical analysis. When you have some ideas for your report, bring them to me for discussion. I will help you define your topic and get you started in identifying resources, including possible web sites. My approval of your report topic is required.

The papers should be typed, double spaced, fully referenced, and have at least five pages (>2000 words) that go beyond the lecture material on the particular topic. The deadline for the papers is the last class day (April 20).

Participation

After final grades are calculated class participation will be evaluated. This could raise your letter grade by as much as one third.

Grading Scale:

Grade Percent Grade Percent Grade Percent Grade Percent

A+ 97 up B+ 87-89 C+ 77-79 D+ 67-69

A 93-96 B 83-86 C 73-76 D 63-66

A- 90-92 B- 80-82 C- 70-72 D- 60-62

E 59 down

Suggestions for Success in the Course:

a) Be faithful in your attendance. If you would go to work under the same situation, you should go to class. If you must be absent, then obtain the lecture notes from a classmate. But this is never a good substitute if your own attendance is a possibility. b) Take abundant notes. Note taking is a demanding activity that requires alert minds and a diligent attitude. Often students are not able to study adequately simply because they were lazy note-takers. Also, index the specific excerpts into your lecture notes as they are mentioned in class.

c) Ask questions as they arise during lecture. I urge you to interrupt me any time the lecture material is not clear to you. If you are confused, probably someone else is too. So don't be shy; speak up.

d) Schedule three hours of study for every class period. This is the standard formula for Tuesday-Thursday classes and should be very adequate for achieving a good grade.

e) Study for comprehension soon after lecture. While the lecture is still fresh in your mind, go over your notes to see whether you understand them. Any confusion you may have can be cleared up during or right after the next class period. If your notes are complete and intelligible, study for mastery can come later (but not just the night before the exam!).

f) Study for mastery by using active study methods. Reading over your lecture notes X number of times is not active and is generally ineffective. Devise a method that challenges you to answer questions

without looking at the answers. The detailed lecture/excerpt outlines you receive are a good place to start in formulating questions. Also, remember to incorporate the excerpt compilation into your study.

g) Be able to argue a point from all sides. Although the focus of the class is to explore ways of disarming the conflict, peacemakers should understand thoroughly the perspectives of the combatants.