

ASTR 151 The Boundaries of Science

Course Description

In this course, we will examine the nature of the physical and the living world with the goal of increasing our appreciation of the scope, wonder, and complexity of physical reality. We will also investigate physical reality and the boundaries of science for any hidden wisdom within this reality which may illuminate the central questions of the purpose of our existence and the meaning of life. This course is designed to allow students to take a more in-depth look at the beauty and complexity of the universe and life and to give food for thought about deeper questions which remain central to human existence.

Prerequisite: None

Course objectives

The objectives are to give a scientifically accurate introduction to the origin and development of the physical universe (cosmology) which has led up to the formation of Earth as a uniquely suitable environment to support life. The complexity of physical life (on the molecular level) and the mystery of human consciousness will also be briefly examined. These and other topics provide examples of features of our existence which may lie outside the naturalistic boundaries of science. These will then be considered for their implications relating to the significance and value of human life, and as possible indications of the nature and existence of God.

Course Content, Format, Bibliography

Content

An outline of teaching and discussion topics typical for the course appears below:

- The nature of physical science
 - Theoretical and objective physical reality: the realm of science
 - The rationality and comprehensibility of the physical nature of the universe
 - Absolute Truth versus Provisional Theory
 - Purpose and meaning in life
- Cosmology and beginnings
 - The big bang theory: scientific background
 - The scientific age and scope of the universe
 - Stellar life cycles, from nebulae to black holes
 - Extravagance—the significance of the size and age of the universe
 - Philosophical and theological implications of a beginning

- The possibility of extra physical dimensions and a multiverse
- Fine-tuning of physical parameters necessary for life: Chance or dance?
- The phenomenal planet Earth
 - Astronomy and the origin of the solar system
 - A unique planet
- The origin of life
 - The origin of complex specified information as relates to biochemical molecules
 - Information theory as applied to molecular biology—no free lunch.
 - The theory of evolution
 - What is the evidence? What is the mechanism?
 - The fossil record
 - Coherence or dissonance with information theory?
 - Theistic evolution
 - Intelligent design
- The boundaries of science: does naturalism reach an impasse?
 - The origin of the universe
 - Fine-tuning of physical parameters
 - The origin of life
 - Information theory
 - Irreducible complexity
 - Probability and time frames
 - Human consciousness
 - Miracles and spirituality
- The correlation between beauty and truth: the intelligibility of nature
- Beauty, complex specified information, and intelligent design: what the universe communicates about God

Course Format

Class meetings will emphasize discussion questions in which students can be actively involved. Differing opinions are welcome and will be evaluated in light of scientific and philosophical consistency.

Evaluation will be based on daily written reflections and summaries of class content, an objective quiz over the astronomy and cosmology content, a short article review, and a final research-based position paper on a topic related to the course content.

Bibliography

- Behe, Michael, "Darwin's Black Box" (1998).
- Brush, Nigel, "The Limitations of Scientific Truth. Why Science Can't Answer Life's Ultimate Questions," (2005).
- Consolmagno, Guy, "God's Mechanics," (2008).
- Davies, Paul, "The Mind of God. The Scientific Basis for a Rational World," 1992.
- Davies, Paul, "The 5th Miracle" (1999).
- Dembski, William A. "Intelligent Design as a Theory of Information"
- Dubay, Thomas, "The Evidential Power of Beauty. Science and Theology Meet," 1999.
- Gange, Robert "Origins and Destiny" (1985).
- Gingerich, Owen, "God's Universe" (2006).
- Gonzalez, Guillermo "The Privileged Planet" (2004).
- Lennox, John, "God's Undertaker: Has Science Buried God?" (2007).
- Malone, John, "Unsolved Mysteries of Science," (2001).
- Meyer, Stephen C., "The Origin of Biological Information and the Higher Taxonomic Categories," Proc. of the Biological Society of Washington, **117**, 213 (2004).
- Penfield, Wilder, "The Mystery of the Mind" (1975).
- Penrose, Roger, "The Road to Reality: A Complete Guide to the Laws of the Universe," (2005).
- Quastler, Henry "The Emergence of Biological Organization" (1964).
- Ross, Hugh "The Creator and the Cosmos" (2001).
- Ross and Rana, "Origins of Life" (2004).
- Schroeder, Gerald L., "The Hidden Face of God. Science Reveals the Ultimate Truth," 2001.
- Seeds, Michael A., "Astronomy: The Solar System and Beyond," 3rd Ed. (2003).
- Spetner, Lee, "Not by Chance" (1996).
- Strobel, Lee, "The Case for a Creator. A Journalist Investigates Scientific Evidence that Points Toward God," 2004.
- Von Baeyer, Hans Christian, "Information: The New Language of Science," (2003).
- Ward, Keith, "The Big Questions in Science and Religion," (2008).
- Wiggins, Arthur, and Wynn, Charles, "The Five Biggest Unsolved Problems in Science," (2003).
- Yockey, Hubert, "Information Theory and Molecular Biology" (1992).
- Yockey, Hubert, "Information Theory, Evolution, and The Origin of Life," (2005).

Optional Texts:

“God's Undertaker: Has Science Buried God?” by John Lennox

“Cosmology: A Very Short Introduction.” by Peter Coles

“The Expanding Universe. A Beginner’s Guide to the Big Bang and Beyond.” by Mark A. Garlick

“The Hidden Face of God. Science Reveals the Ultimate Truth.” by Gerald L. Schroeder