

GREAT QUESTIONS: QUESTIONS THAT HAVE CHANGED THE WORLD*

HON 183 - 3 credit hours

Course Instructor: Dr. Dave Pruett, Department of Mathematics & Statistics

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Course Description: “Which [do we] love more, the small island of [our] so-called knowledge or the sea of infinite mystery?” (Karl Rahner) “Great Questions” are those that radically alter our perceptions of physical reality, of self, and/or of our place in the universe. For example, Jacob Bronowski observed of Einstein that he was “a man who could ask immensely simple questions” from whose answers he could “hear God thinking.” Einstein’s theories of special and general relativity each originated from simple questions and Gedanken (thought) experiments that can be readily grasped by ordinary persons. It is the answers that are extraordinary. The course will examine selected interrelated “great questions” from the domains of science and philosophy as well as their impact upon human perceptions of self and of physical reality.

Texts:

- 1) Timothy Ferris, *Coming of Age in the Milky Way*, Perennial, 2003.
- 2) Erwin Schrodinger, *What is Life? with Mind and Matter*, Cambridge University Press, 1967.
- 3) Immanuel Kant, *Prolegomena to Any Future Metaphysics*, translation by James W. Ellington, 2nd Ed., Hackett Pub. Co., 1977.

Syllabus

Date	Topic
Part I--Where am I? (are we?): Questions of Place & Cosmology	
30 Aug	Introductions & Expectations
1 Sept	Does the Earth Move? -- Cosmological Origins
6 Sept	The Dome of Heaven: The Ptolemaic Universe Readings - <i>Coming of Age in the Milky Way</i> , Chaps. 1-2
8 Sept	Earth Dethroned: The Copernican Revolution Readings - <i>Coming of Age in the Milky Way</i> , Chaps. 3-4
13 Sept	The Music of the Spheres: Kepler, Galileo, & Newton Readings - <i>Coming of Age in the Milky Way</i> , Chaps. 5-6, Newton.doc
15 Sept	The Search for Longitude (VIDEO) Readings - <i>Coming of Age in the Milky Way</i> , Chaps. 7-8
20 Sept	Special Relativity I: An “Immensely Simple Question” Readings - <i>Coming of Age in the Milky Way</i> , Chaps. 9
22 Sept	Special Relativity II: A Wrinkle in Time Readings - <i>Coming of Age in the Milky Way</i> , Chap. 10
27 Sept	General Relativity I: The Principle of Equivalence Readings - <i>Coming of Age in the Milky Way</i> , Chap. 10
29 Sept	General Relativity II: Cosmological Implications Readings - <i>Coming of Age in the Milky Way</i> , Chap. 11

4 Oct	Stephen Hawking's Universe (VIDEO): "The Big Bang" Readings - <i>Coming of Age in the Milky Way</i> , Chap. 14
6 Oct	TEST I
Part II--What am I? (are we?): Questions of Biological Origins	
11 Oct	Bronowski's "Old Testament God:" Einstein Readings - Einstein.doc
14 Oct	DISCUSSION: How Old is the Earth? Readings - <i>Coming of Age in the Milky Way</i> , Chaps. 12-13
18 Oct	<i>Darwin, His Daughter, and Human Evolution</i> Readings - <i>Coming of Age in the Milky Way</i> , Chap. 13
20 Oct	<i>The Voyage of the Beagle</i> (AUDIO selections)
25 Oct	Evolution: Theory & Misperceptions
27 Oct	DISCUSSION: "Was Darwin Wrong?" Readings - <i>National Geographic</i> , Nov. 2004
1 Nov	The Quantum Universe I: Uncertainty Readings - <i>Coming of Age in the Milky Way</i> , Chaps. 15-16
3 Nov	The Quantum Universe I: Uncertainty continued
8 Nov	The Quantum Universe II: Wave-Particle Duality Readings - <i>Coming of Age in the Milky Way</i> , Chaps. 17-18
10 Nov	Entropy: The Arrow of Time
15 Nov	DISCUSSION: <i>What is Life?</i> Readings - <i>What is Life?</i>
17 Nov	The Double Helix Readings - <i>Nature</i> , April 25, 1953
Part III--Who am I? (are we?): Questions of Perspective	
22 Nov	Test II
24 Nov	THANKSGIVING HOLIDAY
29 Nov	The Quantum Universe III: Schroedinger's Cat and Quantum Mystery
1 Dec	DISCUSSION: Kant's <i>Prolegomena</i> Readings - <i>Prolegomena</i>
6 Dec	DISCUSSION: Schroedinger's Mind and Matter Readings - <i>Coming of Age in the Milky Way</i> , Chap. 19
8 Dec	Summary Discussion: The Web of Interconnections Readings - <i>Coming of Age in the Milky Way</i> , Chap. 20
15 Dec	FINAL EXAM (8:00-10:00a.m.)

Grading:

This course will examine selected "immensely simple questions" from the domains of philosophy and natural philosophy as well as their impact upon human perceptions of self and of physical reality. Because of the close historical connection between philosophy and natural philosophy (science), it is fitting that these two domains of inquiry should be considered in unison, as "inner" and "outer" approaches to probing the deeper mysteries of the universe. Because the course was designed expressly for Honors students, it will be interdisciplinary in nature and will incorporate a variety of formats and evaluation techniques.

Balance & Interdisciplinary Connections - The “immense questions” to be considered naturally blur the lines between scientific inquiry, philosophy, and religion. The course will especially focus upon resonances; that is, those points of nexus where scientific and philosophical lines of inquiry lead toward mutual illumination.

Critical Thinking - A premise of the course is that the process of inquiry is as at least as important as the answers gleaned. That process should follow appropriate guidelines relative to “critical thinking.”

Primary Sources - Whenever appropriate, readings will excerpted from primary sources. For example, Darwin’s Voyage of the Beagle, Schroedinger’s What is Life? and Kant’s Prolegomena are each primary.

Writing Intensive - Students will be required to write one book report and to keep a journal in which to respond to class discussions. Tests will include essay questions. The book to be reported upon should be chosen from a list of approved references or pre-approved alternatives, and the report will be due early in the semester to ensure that students are invested in some component of the course, for which they bring to the class relative expertise.

Communication Intensive - Approximately 1/3 to 1/2 of class time should be devoted to discussion in seminar format. Each student (in groups of 4-5) will be required to assume leadership for a class discussion. Good communication skills will be emphasized. Among these, students should employ critical and sensitive listening behaviors and should be able to deliver effective and concise oral presentations.

Historical & Cultural Context - What is the story behind the scientific or philosophical achievements? Who were the principal players? What was their historical context? Their cultural perspective? What qualities did they have that predisposed them to ask the relevant questions? What obstacles did they overcome? What was the impact of their achievement upon their culture? Upon humankind?

Grading Scale: 90-100 A, 80-89 B, 70-79 C, 60-69 D, below 60 failing, with appropriate +/-

Weight

- Assignment 10 %
- Class participation (attendance, contribution to discussions, sensitive listening) 15%
- Presentations (“expertise” assignment 5%; leadership of assigned discussion 10%) 18 %
- Bi-weekly journal 30 %
- Two one-hour tests; see dates on schedule 12 %
- 4-5 page book report 15 %
- Final exam

Contact person: Dave Pruett, pruettcd@jmu.edu.