

HONR 219Q

Perspectives on the Cosmos: From the Ancient Philosophers to Modern Science

Spring 2009

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Office Hours: M 3-4pm, W 9-10am, or by appointment

Course web page: www.astro.umd.edu/~ssm/HONR219Q**Textbooks:**Harrison: *Cosmology: The Science of the Universe*Stenudd: *Cosmos of the Ancients: The Greek Philosophers on Myth and Cosmology*Ferris: *Coming of Age in the Milky Way***Course Description**

For all of recorded history, and presumably well before that, people have asked the Big Questions: What is the nature of the Universe? How big is it? How old? What is our place in it? For just as long, we've been making up the answers.

Cosmology is the subject that seeks to answer the big questions. As such, it is the nexus where science, philosophy, and religion collide.

This course will explore the subject of cosmology, from both an historical and scientific perspective. In the process, we will examine the roles of faith, philosophy, and empirical knowledge. We will survey prevailing attitudes towards the nature of the world model over time, examining the impact of belief systems on the interpretation of physical evidence. Subjects to be covered include the first vital steps of the ancient philosophers, the tension between geocentric and heliocentric world models at the time of Copernicus and Galileo, and the modern scientific world view.

Students will learn to critically examine evidence and its interpretation, learning to appreciate the strengths and shortcomings of various forms of human knowledge. Emphasis will be placed on the importance and limitations of empirical evidence, and the dangers inherent in the interpretation of evidence within a preconceived framework. The student will gain a detailed knowledge of modern cosmology, and develop an appreciation for both its strengths and inherent weaknesses. In the process comes a respect for the diverse paths to knowledge followed by humanity.

Course work will include a midterm and final. There will be weekly readings and written reading responses. An essential part of the seminar will be lively discussion of the topic at hand; as such, class participation will constitute a portion of the grade. Students will be responsible for researching and presenting an appropriate subject chosen in consultation with the instructor. The presentation will take the form of a term paper and an oral presentation to the class. Examples of potential topics and readings can be found at

<http://www.aip.org/history/cosmology/ideas/greekworldview.htm>.

Course Structure

Meetings: Tuesdays 2:00-4:30PM in PAC 1809

This is a three credit course consisting of weekly [meetings](#). Typical meetings will be a mixture of lecture and class discussion. The role of the Professor in this seminar is more tour guide than lecturer. The point is to guide and inform an intelligent discussion involving the entire class.

The discussion each week will be start from the assigned [readings](#). As such, it is essential that each student complete the reading prior to the



class in which it is to be discussed. To foster careful thought on the readings, a concise written response to each assigned reading will be due at the time they are to be discussed.

The readings serve as the launching point for the discussion, which will focus on the topic at hand but need not be limited to it. Participation in the discussions is fundamental to this seminar. Consequently, attendance and preparedness is essential. We seek to ask the Big Questions, ponder the answers others have offered, and perhaps develop a few answers - or at least questions - of our own.

Work and Grades

Please see <http://www.astro.umd.edu/~ssm/HONR219Q/work.html> and below for a description of the course work and grading policy.

This course seeks to inform your knowledge of cosmological issues, exercise your faculty for creative and philosophical thought, and develop your powers of critical thinking. One desires both questions and answers; how to recognize a compelling argument, and how to debunk a false one. The course work is structured to inform and exercise these abilities through reading, writing, and oral communication. The ability to express oneself clearly both in writing and orally is as important as thinking clearly in the first place.

Missed Classes

The first rule of missing class is: **DON'T**.

The University recognizes only a few excuses for missing classes, including religious holidays, University-approved travel, and illness. I am not aware of any conflicts with major recognized religious holidays. If there is one, please inform me ahead of time. Except in the case of emergencies, you will know beforehand if you will miss a scheduled class. Please inform me ahead of time and provide appropriate documentation. While it may be possible to make up some work (e.g., reading responses), I will not in general accept these without a valid reason and advanced notice. Moreover, it is impossible to make up class discussion, so missing too many classes will inevitably have a negative impact on your grade.

If a class is missed because the university is closed for some dire reason (e.g., a blizzard) then of course there will be no penalty. We will simply pick up where we left off at the next regular class time. This includes exams; if the university is closed on the scheduled exam date, the exam will occur at the next available time.

Core Requirements

This course qualifies as a CORE Humanities (HO) Course in your CORE Liberal Arts and Sciences Studies Program, the general education portion of your degree program. This is a CORE Distributive Studies Course. CORE-general education has both broad learning outcomes for the program as a whole and outcomes for each of the different CORE Distributive Studies categories. To see the Student Learning Outcomes for CORE, please visit: <http://www.uqst.umd.edu/core/LearningOutcome.htm>. No one CORE course will address all of the Learning Outcome Goals listed for its category. Some courses may contribute to general education in important ways not directly covered by the learning outcomes listed.

University Standards

Please see http://www.astro.umd.edu/~ssm/HONR219Q/univ_std.html and below for the standards that the University of Maryland upholds for Academic Integrity and its policies concerning class conflicts with religious observances and academic accommodations for students with documented disabilities.

Academic Accommodations

If you have a documented disability, you should contact Disability Support Services 0126 Shoemaker Hall. Each semester students with documented disabilities should apply for accommodation request forms that you can provide to your professors as proof of your eligibility for accommodations. The rules for eligibility and the types of accommodations a student may request can be reviewed on the DSS web site at http://www.counseling.umd.edu/DSS/receiving_serv.html.

HONR 219Q Class Meetings

All classes meet Tuesdays at 2pm in PAC 1809.

Readings, and written responses thereto (RR), are to be completed BEFORE the meeting for which they are assigned.

Date	Topic	Reading	Work Due
Jan. 29	Introduction Accessible observational facts Human and Geological timeline The Scientific Method		
Feb. 3	Gods & Myths Creation myths Modes of human knowledge	Harrison: Chapters 1, 25 Ferris: Chapters 1, 2	RR*
Feb. 10	The Ancient Philosophers	Stenudd: All Harrison: Chapter 2 (beginning)	RR
Feb. 17	Revolutions Copernicus to Galileo	Harrison: Chapter 2 Ferris: Chapters 4, 5 Explore Copernicus, Brahe, Galileo, Kepler Read Galileo: Starry Messenger Abbreviated Dialogue Full Dialogue	RR
Feb. 24	The Clockwork Universe Newton, Descartes	Harrison: Chapters 3 & 4 Ferris: Chapter 6	RR
Mar. 3	An Expanding Reality Einstein & Hubble	Harrison: Chapters 8 & 14 Ferris: Chapters 8, 9 See also this AIP website	RR
Mar. 10	MIDTERM	-	MIDTERM
Mar. 17	SPRING BREAK	-	-
Mar. 25	Model Universes	Harrison: Chapters 15, 16, 18 Ferris: Chapter 10	RR
Mar. 31	The Hot Big Bang	Harrison: Chapters 19, 20 Ferris: Chapters 11	RR
Apr. 7	Inflation	Harrison: Chapters 21, 22 Ferris: Chapter 18 Class Handout. See also Ned Wright's cosmology tutorial , especially Flatness & Horizon & Inflation	RR Topic choice for term paper
Apr. 14	The Dark Side	Ferris: Addendum Dark Matter: A brief primer A modest primer Other Perspectives: Does dark matter exist? Dark matter is dead	RR
Apr. 21	Multiverses Can cosmology be a science?	Class Handout (Tegmark) The Case Against Cosmology (Disney)	RR
Apr. 28	Life on Earth	Ferris: Chapters 12, 13	RR
May 5	Life in the Universe	Harrison: Chapter 26 Ferris: Chapter 19 Drake's Equation	Term Paper
May 12	Space Travel	TBD	-
May ??	Final	Date and time TBD	FINAL

*RR = Reading Response: one page written response to assigned reading.

Course Work

Weekly Reading Responses

One page written response to assigned reading. A good response will include a concise description of the topic covered, and your reaction to it. Your reaction should be critical (though not necessarily negative) and may be emotional (do you find the idea compelling? stupid?), but must be well argued. To help focus your response, a particular question related to the reading may be posed.

Group Discussions.

Considerable class time will be devoted to discussion. You may use your Reading Response as the launching point for your contribution to the discussion. We will also pose specific questions to debate, and discuss some issues in small groups prior to wider class discussion.

Term paper: 10 pages, on a topic of your choice.

Midterm and Final Exams.

Exams will be a mixture of essays, fact based knowledge, and challenges of critical reasoning.

Quizes.

There will be short quizzes to hone your focus and help prepare for the larger exams.

Grading and due dates:

10% Participation in Class Discussions*

weekly

20% Reading Responses

weekly, [as assigned](#): 2/3, 2/10, 2/17, 2/24, 3/3, 3/31, 4/7, 4/14, 4/21, 4/28

10% Quizes

Sporadic

20% Midterm exam

March 10, in class

20% Term paper

Due May 5. Select a topic by April 7.

20% Final exam

date & time TBD

*Examples of class participation include, but are not limited to, engaging in class discussion with substantive ideas, questions, and insights; contributions to group projects; and posting to a course e-chat page.

University Standards

Academic Integrity

The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit

<http://www.studenthonorcouncil.umd.edu/whatis.html>.

The University is one of a small number of universities with a student-administered Honor Code and an Honor Pledge, available on the web at www.jpo.umd.edu/aca/honorpledge.html. The Code prohibits students from cheating on exams, plagiarizing papers, submitting the same paper for credit in two courses without authorization, buying papers, submitting fraudulent documents, and forging signatures.

Religious Observances

The University of Maryland policy provides that students should not be penalized for participation in religious observances and that, whenever feasible, they be allowed to make up academic assignments that are missed due to such absences. It is the student's responsibility to inform the instructor of any intended absences for religious observances in advance. Notice should be given as soon as possible but no later than the schedule adjustment period. Prior notification is especially important in connection with final examinations, since failure to reschedule a final examination before the conclusion of the final examination period may result in loss of credits during the semester.