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ENST 391.50: Cosmic Ecology

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Environmental Studies 391.50
Cosmic Ecology: Earth's Journey to the Anthropocene
SYLLABUS

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Personal meetings can be arranged on the UM campus for those in the area.

Course Description

The course will first provide an understanding of how we came to be. The deepest roots of our ancestry will be probed: our lineage in the web of life, formation of Earth, where the elements we are made of arose, the galactic home for the Sun, and the universe of other galaxies. The intent is to demonstrate that an unguided natural course of events has brought us forth, recently and likely temporarily, on a planet that may be typical rather than exceptional. The process from which we emerged is so wondrous that a rewarding role for us is to ensure it continues on the minute speck of the cosmos on which we reside. Nature, nurtured carefully, could yet produce wonders greater than any we can imagine.

A second component of the course will examine humanity's failures as stewards of Earth to the extent that we have triggered the onset of a new geologic epoch, the *Anthropocene*, so-named because it is an epoch during which humans are the dominant force on the planet. Our domination arose quickly as a consequence of humankind's explosive growth of knowledge and its application to increasingly powerful technologies. The result has been a cornucopia of products that fostered unbridled consumption and waste.

The acquisition of planetary powers was so quick it happened unwittingly, but the impacts of our collective actions are now so great that the path that brought us to the present state can no longer be sustained. Change is called for, change that is transformative, not merely incremental. In the third component of the course, the class will consider how to initiate such needed dramatic change.

Challenges will not be equated with problems. Instead, the emphasis will be on opportunities. A different world need not be a worse world; the challenge is to make it a better one. Today's students are presented with an historic opportunity to leave a permanent mark on the course of civilization. Few previous generations have been so fortunate.

After reviewing the concept of Spaceship Earth, the course will describe impacts that are occurring throughout Earth's interconnected systems. Students will stake out their positions on some pending major decisions confronting us all. In doing so, they will weigh ecological, economic, and equity dimensions.

The primary course objective is that hopelessness, despair, and hand-wringing are replaced by hopefulness, optimism and positive action, in which people do what they can, where they are, with what they have.

Purpose

The purpose of the course is to learn together what values and actions will transition humankind from the practices it established in the last century to sustainable practices in the current century. The course therefore presents students an opportunity to be imaginative, creative and innovative. The course belongs to you and your fellow students, all of whom must engage in critical thinking to answer “What should we do?”

Objectives

Students should improve their abilities to:

- Think critically.
- Apply a holistic and systemic approach to solve problems and create opportunities for the benefit of society, now and in the future.
- Appreciate the values of services the natural and physical worlds provide to humans, and the impact humans have on the natural and physical worlds’ abilities to continue providing them.
- Appreciate the temporal and spatial scales of change, including consequences of exponential growth.
- Develop communications skills – verbal, written, and electronic – enabling understanding across disciplines, sectors, and generations.
- Act ethically with respect to peoples from other cultures, future generations, and other species in the biosphere.
- Find information, evaluate its accuracy, and transform it into practical uses.
- Understand that humanity’s current predicament is an opportunity for greatness rather than a cause of despair.

Required Online Tools

- Access to a personal computer with audio capabilities
- Internet access and a web browser
- A University of Montana e-mail account.
- Microsoft Word and PowerPoint , or Apple software that can view them both and hear audio on PowerPoint presentations.
- Ability to open pdf, jpg, and video files

I advise visiting umonline.umt.edu and studying the **Student Resources**. You will also see a location for **Tech Support**.

Required Textbooks

Three textbooks will be required reading. They will not be read sequentially. Instead, some chapters from each will be assigned according to the topic under consideration.

Neil Shubin, **The Universe Within: Discovering the Common History of Rocks, Planets, and People**, New York: Pantheon Books (2013).

The subtitle of Shubin's book summarizes its main point. The book recognizes that life, including you, cannot be divorced from the cosmos, the planet, or time. Another important message is how the great cycles of the Earth System connect through you, the rest of life, and the non-living planet as well.

George A. Seielstad, **Dawn of the Anthropocene: Humanity's Defining Moment**, Alexandria, VA: American Geosciences Institute (2012). The author points out that we live at a time of extraordinary opportunity. Few generations are granted the chance to change the course of civilization; nearly all are entrapped to travel a well-established path along which the future is let happen rather than created. The current generation must quickly depart from the past. In doing so, all will enjoy the rare opportunity to use the two characteristics that most distinguish humans from all else that lives: our unlimited creativity and our sense of moral purpose.

Eric Lambin (translated by M.B. DeBevoise), **The Middle Path: Avoiding Environmental Catastrophe**, Chicago: The University of Chicago Press (2007), ISBN 978-0-226-46853-2.

Lambin's book offers suggestions for improving our stewardship of the Earth. The book's outlook is optimistic while also pointing out the need for urgency. The environment, society, and economics are nicely linked. The author has an appreciation for Earth as a unified system.

Seielstad's book is electronic only (printing a book advocating sustainability on dead trees seemed inconsistent), available online at <http://www.agiweb.org/pubs/pubdetail.html?item=111001>. The book can be read on an Amazon Kindle. For those who do not have a Kindle, a free app can be downloaded from the website just referenced (at lower right). The app allows Kindle books to be read on smartphones, tablets, or computers.

Shubin's and Lambin's books are available at the University of Montana Bookstore (among other places). You may order them online. Visit <http://www.montanabookstore.com>. Click on Course Materials/Mountain Campus/Buy and go from there.

Additional Educational Resources

The instructor has prepared several PowerPoint presentations, which you are required to watch and to listen to. You may wish to record notes from these presentations along with the highlights you are recording throughout the semester from the textbooks.

Among supplementary materials for several topics throughout the semester are articles from journals and magazines, videos posted on the WWW, and references to websites.

This whole combination of educational aids is to show specific topics from a variety of viewpoints using a variety of techniques. The more of this material you study, the greater the value this course will have for you.

Course Schedule

THEME	DATE	TOPIC	READING	WRITE	DISCUSS
Evaluating Humanity's Status	Jan. 26-Feb. 1	Humans' Place in Space	Shubin Ch. 2 Seielstad Prologue, Ch. 1		
	Feb. 2-8	Humans' Moment in Time	Seielstad Ch. 2		
	Feb. 9-15	Source of Life's Ingredients	Shubin Ch. 3		
	Feb. 16-22	Humans' Strand in Web of Life	Shubin Ch. 5		
	Feb. 23-Mar. 1	The Earth System	Shubin Ch. 6 Lambin Chs. 1,2		
Drivers of the Anthropocene	Mar. 2-8	Lithosphere and Pedosphere	Seielstad 3		
	Mar. 9-15	Atmosphere	Seielstad 5 Shubin 8,9		
	Mar. 16-22	Hydrosphere	Seielstad 3		
	Mar. 23-29	Biosphere	Shubin 7 Seielstad 4 Lambin 3		
	Mar. 30-Apr. 5	SPRING BREAK			
	Apr. 6-12	Anthrosphere	Shubin 10 Seielstad 6		
Seizing the Opportunity	Apr. 13-19	Global Human Family	Seielstad 7 Lambin 4		
	Apr. 20-26	Environmental Ethics	Seielstad Epilogue Lambin 5, 6		
	Apr. 27-May 3	Solutions	Seielstad 8 Lambin 7		
	May 4-8	Your Generation's Great Work		N	Y

Assignments

Assignments are posted in each week's or weeks' topic, available when you click on the appropriate folder on the Moodle site. During a typical week, you are assigned to view and listen to a PowerPoint presentation, complete the textbook assignment, and often to study some supplemental material (additional readings, videos, websites, and the like). Then you may be required to submit a written paper, participate in a class discussion, or both.

Because the course had not begun when the entire curriculum was completed (a University of Montana requirement), it is possible that some changes will be made during the Spring 2015 semester; likely none, though, will be major.

Assignments are due by 11:55 PM of the Sunday ending a week's work (or occasionally two weeks' work). These deadlines are firm. Discussions end and papers will not be accepted after the posted deadlines.

- **Semester-Long Reading/Writing Assignments.** My wish is that this course will have some value lasting beyond its conclusion (May 8). One strategy I prescribe for lasting value is an assignment that you log highlights of the key points you wish to retain from the assigned readings, especially, but also from other material presented. You are free to design your own format for recording key points. The best way to compile meaningful information is to keep notes as you are studying the material. Previous students can testify that it is a mistake to wait until the deadlines to compile notes. Notes will be due at the end of each major theme, that is, by 11:55 PM on March 1, April 12, and May 5. Keep track which book was the source of your notes entry.
- **Written Assignments** during particular weeks will vary in length and depth, also in maximum points that can be earned.
- **Discussion Forums.** You may learn as much from each other as from me or various authors. That will be true only if everybody contributes to vigorous discussions. It will be especially true if each of you contributes more than once per discussion topic. Every forum has an early (approximately mid-week) deadline, as well as a final one at the Sunday night deadline (11:55 PM). Those who contribute only close to the deadline will post comments unlikely to be read and so late they prevent any reactions from fellow students; hence the mid-week deadlines. Everybody must respond to contributions made by at least two others, but also must make original contributions.

Grading

- **POINT SYSTEM**
- ✓ **Semester-Long Reading/Writing Assignment.** This is your record of the key points from the beginning of the semester through May 3, 2015. Two other deadlines precede this final one. The notes are intended to retain value for you well after this course has ended. The maximum total is 300 points, 100 at each deadline.
- ✓ **Discussion Forums.** 50 points each. Given that there are eight discussions throughout the semester (two were assigned for Pedosphere/Lithosphere), as many as 400 points can be earned through active and thoughtful participation.

- ✓ **Written Assignments.** The assignments vary in depth requested. Accordingly, the points awarded vary among the assignments. The maximum total for all written assignments (not counting the two semester-long assignments) is 1810 points

- **RUBRIC**

The world, if it is ever to become sustainable, is in desperate need of creative, new ideas. Without them, we will continue on a path that passes an ever-deepening challenge to the next generation. Accordingly, the grading system will emphasize this need. It will also heavily weigh the depth of your thinking, how critically you analyze the assigned issue, and the quality of your information sources. Of course, how well you express your thoughts will be a factor. Approximate relative weighting of these factors will be:

Quality of Analysis and its Cited Evidence:	45%
Originality:	35%
Organization of Thought and Its Expression:	25%
Details (Grammar, Spelling, Punctuation, etc.):	5%

Your grade for Discussions will be based primarily on the quality of your comments, much less so on their quantity. Another factor will be the extent to which your comments enhance discussion entries by others.

- **GRADE SCALING**

A	93-100%
A-	90-92%
B+	87-89%
B	83-86%
B-	80-82%
C+	77-79%
C	73-76%
C-	70-72%
D	60-69%
F	Less than 60%

Academic Integrity

Academic misconduct is subject to academic penalty by both the instructor and/or disciplinary sanction by the University. These penalties and sanctions may include a failing grade for an assignment, removal from class, or more serious actions depending upon the nature of the misconduct. All students must be familiar with, and adhere to, the Student Conduct Code. The Code is available at http://life.umt.edu/vpsa/student_conduct.php.

Disability Statement

If you have a disability for which accommodations are needed, please notify me in the first week of the semester. In addition, please contact:

Disability Services for Students (DSS)

Lommasson Center 154

The University of Montana

Missoula, MT 59812

(406) 243-2243 (Voice/Text)

(406) 243-5330 FAX

dss@umontana.edu

<http://life.umt.edu/dss/>