

Future Dilemmas: Energy, Food & Water

IDIS 491 – 3 credit hours

Course Instructor: Robert Doyle (physics & engineering)

Frostburg State University

University Honors Program

Maureen Connelly, Director

Course Description: Our human civilization's prospects are rather troubled. We are rapidly using up easily extracted fossil fuels, the legacy of hundreds of millions of years of buried plant and animal matter. Each year, fossil fuel combustion puts increasing amounts of carbon dioxide into the atmosphere, beyond the capacity of our plants and oceans to absorb it. The shift to renewable energy sources is aching slow, particularly in industrial countries that use much more energy per capita than the developing world. Considering the sluggish pace of change, what are the likely energy sources in the mid-21st century? Since our steady supply of food relies on large amounts of fossil fuels for growing and transporting food, what foods will be available when energy costs are much higher? With increasing human populations across the globe, how will the available supplies of fresh water be stretched, particularly in developing countries with poor-quality water and rapid population growth. "Future Dilemmas" will use two texts, "The Party Is Over" by Richard Heinberg and "Plan B: 2.0" by Lester R. Brown. The first text outlines the central laws of energy, our history of energy extraction and likely scenarios of the future if our energy sources are not altered. "Plan B: 2.0" by Brown outlines strategies that will take our society towards sustainable living in regard to energy, food and water.

Texts

Richard Heinberg. 2005. *The Party Is Over: Oil, War and the Fate of Industrial Societies*. New Society Books.

Lester R. Brown. 2006. *Plan B 2.0: Rescuing a Planet Under Stress and a Civilization in Trouble*. Norton.

Syllabus

Date	Topic
Week 1	Course Opening - Planetarium Presentation: "Report on Planet Earth," Class Discussion For next class, read "Introduction," <i>The Party Is Over</i> , go over discussion questions
Week 2	Student Questionnaire; Watch "The End of Suburbia" documentary, featuring Heinberg and others; Class Discussion on documentary and <i>The Party Is Over</i> "Introduction" For next 2 classes, read <i>The Party is Over</i> Chapter One ("Energy, Nature & Society") Prepare for next 2 classes by preparing answers to discussion questions
Week 3	Thermodynamic Basics; Life forms in terms of mobility, energy sources; Ecology essentials including 1/10, carrying capacity, cycles, types of species Discussion Questions followed by group discussion and group presentations
Week 4	Ways that humans have expanded their carrying capacity: takeover, tools, specialization, drawdown, complexity, and collapse; Factors leading to success of American society Discussion Questions, followed by group discussion/presentations

	<p>For next 2 classes, read <i>The Party is Over</i> Ch.2 ("Agriculture & Fossil Fuel Eras")</p> <p>Prepare for next 2 classes by preparing answers to discussion questions</p>
Week 5	<p>Agricultural Era; Coal; Electrification; The Two Phases of Petroleum; Energy in Warfare; Transformation and Agriculture; Discussion Questions & Group Presentations</p>
Week 6	<p>The Oil Era – Part One 1950-1980; Part Two 1980 to 9/11/01</p> <p>Discussion Questions followed by group discussion and group presentations</p> <p>For next class, read <i>The Party is Over</i> Ch. 3 ("Lights Out – Hubbert & Peak Oil")</p> <p>Prepare for next class by preparing answers to discussion questions</p>
Week 7	<p>9/11; Iraq War and outcome; M. King Hubbert; Predictions for peak oil; Hubbert insights extended; Cornucopians and other naysayers</p> <p>Discussion Questions followed by group discussion and group presentations</p> <p>For next class, read <i>The Party is Over</i> Ch. 4 ("Non-Petroleum Energy Sources")</p> <p>Prepare for next 2 classes by preparing answers to discussion questions</p>
Week 8	<p>Conventional energy sources – Natural gas, coal and nuclear</p> <p>Discussion Questions followed by group discussion and group presentations</p>
Week 9	<p>Other sources – wind, photovoltaic, hydrogen, hydroelectric, geothermal, fusion; Discussion Questions followed by group discussion and group presentations</p> <p>For next class, read <i>The Party is Over</i> Ch. 5 ("Adjusting to Low Energy Way of Life")</p> <p>Prepare for next 2 classes by preparing answers to discussion questions</p>
Week 10	<p>Basic needs – food, heat/cool, transportation, environment, health & information</p> <p>Questions followed by group discussion and group presentations</p>
Week 11	<p>National, political, & social consequences; Global upheavals with energy decline Discussion Questions followed by group discussion and group presentations</p> <p>For next 2 classes, read <i>Party Over</i> Ch. 6, Afterword ("Managed Shrinkage & Likelihoods")</p> <p>Prepare for next 2 classes by preparing answers to discussion questions</p>
Week 12	<p>Managed shrinkage applied to home, community, nation, and globe</p> <p>Discussion Questions followed by group discussion and group presentations</p>
Week 13	<p>A plea for realism; Saudi enigma; Oil reserve games; Latest studies; Hope for technological miracle; Electing new kinds of leaders</p> <p>Discussion Questions followed by group discussion and group presentations</p>
Week 14	<p>Short story due on 2059 family, Midterm Exam on <i>Party's Over</i> – Intro, Chs.1-6</p> <p>For next class, read <i>Plan B 2.0</i> – Chapter One ("A New World")</p> <p>Prepare for next class by preparing answers to discussion questions</p>
Week 15	<p>Midterm return; Humanity's demands on nature vs. nature's regeneration; Societal collapses in past; Plan B being tried by a few countries; Discussion Questions followed by group discussion and group presentations</p> <p>Read <i>Plan B 2.0</i> – Chpt.3 ("Emerging Water Shortages")</p> <p>Prepare for next class by preparing answers to discussion questions</p>

	Class
Week 16	<p>Descending water levels; Dwindling rivers & lakes; Effects on agriculture & fish Discussion Questions followed by group discussion and group presentations Read <i>Plan B 2.0</i> – Ch.4 ("Warming & Consequences")</p> <p>Prepare for next class by preparing answers to discussion questions</p>
Week 17	<p>Rising temperatures; Melting glaciers & polar ice; Sea rise; Storm strengthening Discussion Questions followed by group discussion and group presentations Read <i>Plan B 2.0</i> – Ch.5 ("Natural Systems Stressed")</p> <p>Prepare for next class by preparing answers to discussion questions</p>
Week 18	<p>Shrinking forests; Topsoil loss; Collapsing fisheries; Disappearing species Discussion Questions followed by group discussion and group presentations Read <i>Plan B 2.0</i> – Ch. 6 ("Signs of Early Decline")</p> <p>Prepare for next class by preparing answers to discussion questions</p>
Week 19	<p>Our social divisions; Health challenges; Resource conflicts & refugees Discussion Questions followed by group discussion and group presentations</p>
Week 20	<p>Exam on <i>Plan B 2.0</i>, Chs.1,3,4,5, 6 Read <i>Plan B 2.0</i> – Ch. 7 ("Eradicating Poverty and Stabilizing Population")</p> <p>Prepare for next class by preparing answers to discussion questions</p>
Week 21	<p>Universal basic education; Stabilizing population; Improving health; HIV/AIDS; Reducing farm subsidies & debt; Poverty eradication financing Discussion Questions followed by group discussion and group presentations Read <i>Plan B 2.0</i> – Ch. 8 ("Restoring the Earth")</p> <p>Prepare for next class by preparing answers to discussion questions</p>
Week 22	<p>Bringing back forests; Water needs for nature; Restoring fisheries; Protecting plant and animal diversity; The cost for restoration Discussion Questions followed by group discussion and group presentations Read <i>Plan B 2.0</i> – Ch. 9 ("Feeding Seven Billion [Humans] Well")</p> <p>Prepare for next class by preparing answers to discussion questions</p>
Week 23	<p>Improving land productivity; Better use of water; Getting more protein; Moving down the food chain; Discussion Questions & Group Presentations Read <i>Plan B 2.0</i> – Ch.10 ("Stabilizing Climate")</p> <p>Prepare for next class by preparing answers to discussion questions</p>
Week 24	<p>Higher energy efficiency; Harnessing the wind; Hybrid cars; Solar cells; Geothermal energy; Cutting carbon emissions; Discussion Questions & Group Presentations Read <i>Plan B 2.0</i> – Ch. 11 ("Designing Sustainable Cities")</p> <p>Prepare for next class by preparing answers to discussion questions</p>
Week 25	<p>City ecology; Better urban transport; City farming; Reducing urban water use; Dealing with urban slums; Bringing nature into cities; Discussion & Presentations</p>

	Read <i>Plan B 2.0</i> – Ch. 12 ("Building a New Economy") Prepare for next class by preparing answers to discussion questions
Week 26	Shifting taxes; Subsidies; Ecolabeling (natural products); Material recycling; Some natural disasters as wake-up calls; Discussion & Group Presentations Read <i>Plan B 2.0</i> – Ch. 13 ("Building a New Future") Prepare for next class by preparing answers to discussion questions
Week 27	Tipping points in the environment; Mobilization to assure the future; What individuals can do; Discussion Questions & Group Presentations
Week 28	Short story on family in 2109 due; Exam on <i>Plan B 2.0</i> Chs.7-13

Grading Policy:

In most regular classes (24), there will be a set of discussion questions on the readings posted on Blackboard that relate to the reading for that class as well as group presentations based on situations related to the readings. A student may earn up to 10 points per class for his/her contribution to the discussion and group presentations. These class points will be posted on blackboard.

There are 3 exams each worth 100 points.

There are 2 short stories of at least 2,000 words where a family is portrayed in the context of the material presented in the text readings. Each typed short story will be graded on clarity, creativity, and the usual norms for papers. Each short story is worth up to 50 points. Both the short story scores and test scores will be posted in a timely manner on Blackboard.

The maximum point total will be $240+300+100 = 640$. To allow for a few absences, the point totals for the final course grades are adjusted to:

Above 539 = A
539-480 = B
479-420 = C
419-360 = D
Below 360 = F

Paper Policy: Papers are due on dates given in syllabus. Since the papers are based more on a grasp of the readings than a laborious process of citing references, multiple drafts, etc. there will be no extensions. The papers are submitted as typed, double-spaced pages numbered with a title and author name prominently displayed on top of page 1. If there are a number of characters, it would be helpful to have a list of characters, with each character briefly described, particularly in terms of their relation to each other. In exceptional cases, the papers may be sent electronically to the instructor the day of the previous class (before paper is due).

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