

SUS 20010
Sustainability: Principles and Practices
Spring 2012

Course Time and Location
T/Th, 2:00 - 3:15 PM, DeBartolo 141

Professors

Joe Fernando, Professor of Engineering and Geosciences: 311D Cushing
(fernando.10@nd.edu, 631-9346)

Anthony Serianni, Professor of Chemistry and Biochemistry: 428 Stepan (aseriann@nd.edu,
631-7807)

John Sitter, Professor of English: 181 Decio (jsitter@nd.edu, 631-7185)

Andy Weigert, Professor of Sociology: 746 Flanner (aweigert@nd.edu, 631-7408)

Honor Code

All students must familiarize themselves with the Honor Code on the University's website and pledge to observe its tenets in all written and oral work, including oral presentations, quizzes and exams, and drafts and final versions of essays.

Required Texts

1. *The Post Carbon Reader (PCR)*, eds. Heinberg and Lerch (Watershed Media, 2010)
2. L. Brown, *World on the Edge* (Norton, 2011)
3. T. C. Boyle, *A Friend of the Earth* (Penguin)
4. D. Meadows, J. Randers and D. Meadows, *Limits to Growth: The 30-Year Update (LTG)* (Chelsea Green Publishing Co., 2004)
5. D. H. Meadows, *Thinking in Systems: A Primer (TIS)* (Chelsea Green Publishing Co., 2008)

Schedule of Assignments and Lectures

(Please note that this schedule may be adjusted periodically)

Part I

Introductions and Initial Assessments

1/17

Introduction of instructors: Who we are; what we do; why we are interested in sustainability; what we expect of ourselves and the students in the course.

*Profs. Fernando, Serianni
Sitter, Weigert*

For next class, prepare one page describing your own definition of “sustainability” (do not consult sources for this exercise at unpacking the ideas informing your current thinking about sustainability).

1/19

Discussion of assumptions; ways of knowing

Prof. Weigert

Part II Presentation and Discussion of Core Knowledge

1/24

What is sustainability? (air, water, food, energy – impact on ecological footprint and global environment – climate change); humans apart from nature vs humans a part of nature

Readings: *Post Carbon Reader (PCR)*, Chaps. 1-3 (pp. 3-40); *World on the Edge* (Brown), Chap. 1 (pp. 3-18)

Profs. Sitter and Weigert

1/26

What is sustainability? Thermodynamics; dynamics of ecological systems; whole-systems approach to studies of complex systems; definitions of progress; projections, models, error, statistics; defining the challenges

PPT Slides and Handouts

Readings: *PCR*, Chaps. 5-6 (pp. 53-73); Brown, Chap. 4 (pp. 45-55); *Limits to Growth – 30-Year Update (LTG)* (Meadows *et al.*), Chap. 1 (pp 1-16) and Chap. 3 (pp. 51-57)

Prof. Serianni

1/31 and 2/2

The science of sustainability; measures, metrics, data; the scientific method; exponential functions

PPT Slides and Handouts

Readings: *LTG*, Chap. 2 (pp. 17-49), Chap. 6 (pp. 203-225); *Thinking in Systems (TIS)* (Meadows), Introduction, Chap. 1 (pp. 1-34) and Chaps 3-4 (pp 75-110); *The Demon-Haunted World* (Sagan), Chaps. 1-2 (pp. 3-39) (**PDF**); *An Introduction To Logic and Scientific Method* (Cohen and Nagel), Chap. 20 (pp. 391-403) (**PDF**)

*Profs. Serianni and
Hernando*

2/7, 2/9 and 2/14

Ethical Imagining and 20th-Century American Environmentalism

Profs. Sitter and Weigert

2/7

Readings: Boyle, *A Friend of the Earth*, Part One (pp. 1-130); Aldo Leopold, “The Land Ethic” (from *A Sand County Almanac*, 1948) (**PDF**)

2/9

Readings: Boyle, *A Friend of the Earth*, Part Two (pp. 131-250); Holmes Rolston, “Humans: People on their Landscape,” from *A New Environmental Ethics* ([PDF](#))

2/14

Readings: Boyle, *A Friend of the Earth*, Part Three (pp. 251-349)

2/16 and 2/21

Global and Social Dimensions of Sustainability

Profs. Sitter and Weigert

2/16

Readings: *PCR*, Chaps. 20, 22 and 29 (pp. 259-78; pp. 283-91; pp. 385-405); Brown, Chap. 6, “Environmental Refugees: The Rising Tide” (pp. 72-83)

2/21

Readings: Brown, Chaps. 7 and 8, “Mounting Stresses, Failing States,” “Building an Energy-Efficient Global Economy” (pp. 72-115); Speth, “The Limits of Today’s Environmentalism” (Chap. 3 of *The Bridge at the Edge of the World* ([PDF](#)))

2/23

Impacts of non-sustainable human activities: the negative consequences of inaction (specific examples); brief survey of human history: factors influencing the longevity of past human civilizations and societies

Readings: *PCR*, Chaps. 13, 14 and 15 (pp. 177-203)

*Prof. Mark Schurr
Department of Anthropology*

2/24 (Friday)

An essay of about 1000 words due on Friend of the Earth and sustainability questions (due before 5:00, in 356 O’Shaughnessy)

Part III

Discussion of Specific Elements of Global Sustainability

2/28

Population

Readings: *PCR*, Chap. 12 (pp. 153-74); Brown, Chaps. 11-12, “Eradicating Poverty, Stabilizing Population, and Rescuing Failing States” and “Feeding Eight Billion” (pp. 151-80)

Profs. Sitter and Weigert

3/1 MID-TERM EXAMINATION

3/6

Energy & Transportation
PPT Slides and Handouts

Prof. Serianni

3/6

Readings: *PCR*, Chaps. 16-19 (pp. 207-55), Chap. 23 (pp. 295-313) and Chap. 27 (pp. 347-60); Brown, Chap. 9 (pp. 116-35); *Carbon-Free and Nuclear-Free – A Roadmap for U.S. Energy Policy* (Makhijani), Chaps. 1-3 (pp. 1-72) (**PDF**); *LTG*, Chap. 3 (pp. 87-107); *The End of Abundance – Economic Solutions To Water Scarcity* (Zetland), Chap. 6 (pp. 123-138) (**PDF**); *The Crash Course* (Martenson), Chaps. 15-18 (pp. 125-183) (**PDF**)

3/8

Guest Lecture: Professor Prashant Kamat (Notre Dame Radiation Laboratory)
Solar Energy - Beyond the Hype

3/20 and 3/22

Atmosphere & Climate

Profs. Fernando and Serianni

Readings: *PCR*, Chaps. 5 and 6 (assigned earlier) (pp. 53-73); *Atmospheric Chemistry and Physics – From Air Pollution to Climate Change* (Seinfeld and Pandis), Chap. 1 (pp. 1-8) and Chap. 23 (pp. 1026-1049); *Common Wealth* (Sachs), Chaps. 3-4 (pp. 57-114) (**PDF**)

Supplemental Reading

M. Lynas, *Six Degrees – Our Future on a Hotter Planet* (National Geographic, 2008)

3/27

Water Resources

Profs. Fernando and Serianni

3/27

Readings: *PCR*, Chap. 7 (pp. 77-94); Brown, Chap. 2, “Falling Water Tables and Shrinking Harvests” (pp. 21-33); *The End of Abundance – Economic Solutions To Water Scarcity* (Zetland), pp. 3-24, Chaps 1-4 (pp. 31-97) (**PDF**); *Common Wealth* (Sachs), Chap. 5 (pp. 115-137) (**PDF**); *The Crash Course* (Martenson), Chap. 21 (pp. 205-211) (**PDF**)

3/27 and 3/28 Visit to Campus by Professor Wes Jackson (The Land Institute, Kansas)

3/29

Guest Lecture: Professor David Lodge (Department of Biological Sciences, Notre Dame)
Water Use: Trade-offs In Using Water for Different Ecosystem Goods and Services

4/3 and 4/5

Agriculture & Food
PPT Slides and Handouts

Profs. Serianni and Fernando

Readings: *PCR*, Chap. 9-10 (pp. 119-39); Brown, Chap. 5, “Emerging Politics of Food Scarcity”

(pp. 59-71); *Toward Sustainable Agricultural Systems in the 21st Century* (National Research Council, 2010), Chaps. 1 and 2 (pp 15-82) ([PDF](#)); *LTG*, Chap. 3 (pp. 57-86); *The End of Abundance – Economic Solutions To Water Scarcity* (Zetland), Chap 5 (pp. 99-121) ([PDF](#)); *The Crash Course* (Martenson), Chap. 20 (pp. 197-203) ([PDF](#))

Supplemental Reading

Wendell Berry, *The Unsettling of America – Culture and Agriculture* (Sierra Club books, 1977)
Barry Estabrook, *Tomatoland* (McMeel Publishing, 2011)

4/10 and 4/12

Waste, Pollution, Restoration & Renewal

PPT Slides and Handouts

Profs. Serianni and Fernando

Readings: *PCR*, Chap. 28 (pp. 363-81); *LTG*, Chap. 3 (pp. 108-127); Brown, Chap. 10 (pp. 136-50); *The Ecology of Commerce* (Hawken), Chap. 3 (pp. 45-64); *Cradle To Cradle* (McDonough and Braungart), Chaps. 1-4 (pp. 17-117) ([PDF](#))

Supplemental Reading

Mark Schapiro, *Exposed – The Toxic Chemistry of Everyday Products* (Chelsea Green, 2007)

**Part IV
Closure**

4/17

Predictions, Forecasting, Backcasting, and Utopias; Education; Empowerment.

Readings: *PCR*, Chaps. 23-27 (pp. 295-360), Chap. 30 (pp. 409-418), Chaps. 33-34 (pp. 442-458); Brown, Chap. 13 (183-202); *TIS*, Chaps 5-7 (pp. 111-185); *LTG*, Chaps 7-8 -pp. 235-284

Profs. Sitter and Weigert

4/19

Guest Lecture: Professor Lee Tavis (Business School)

Values-Based Management and Sustainability in the Business Enterprise

4/24

Guest Lecture: Professor Celia Dean-Drummond (Department of Theology)

Ecology, Ecotheology, and Catholic Social Teaching

4/26

Reconsiderations and Conclusions; Brief Discussion of Capstone Projects (Minors Only)

Course Assignment: *An essay of about 1000 words addressing the following question: What are the implications of this course for my (our) future(s)?*

5/1

Student Self-reflection

Profs. Fernando, Serianni, Sitter, Weigert

5/7 FINAL EXAMINATION Monday, 10:30-12:30