

SUS 20010
Sustainability: Principles and Practices
Spring 2013

Course Time and Location
T/Th, 2:00 - 3:15 PM, DeBartolo 125

Instructors

Anthony Serianni, Professor of Chemistry and Biochemistry: 428 Stepan
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John Sitter, Professor of English: 181 Decio (jsitter@nd.edu, 631-7185)

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, exams, and drafts and final versions of essays.

Required Books/Texts

1. T.C. Boyle, *A Friend of the Earth* (Penguin), 2001
2. Ruth Ozeki, *All Over Creation* (Penguin), 2004
3. Holmes Rolston, *A New Environmental Ethics* (Routledge), 2012
4. Jorgen Randers, *2052: A Global Forecast for the Next Forty Years* (Chelsea Green), 2012

Schedule of Lectures, Assignments and Exams

Please note that this schedule may be adjusted periodically, and that additional readings will be assigned throughout the term.

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| Jan 15 | Course Overview, Objectives and Expectations
(<i>Serianni and Sitter</i>) |
| Jan 17 | What is Sustainability? Definitions, scope, concepts, interdisciplinary nature, controversies, challenges
Rolston, Chapter 1: <i>The Environmental Turn</i>
Rolston, Chapter 2: <i>Humans: People on their Landscapes</i>
(<i>Serianni and Sitter</i>) |

- Jan 22,24,29 The *Science* Behind Sustainability (Tools)
(*Serianni*)
(a) Technical definitions/core principles/concepts
(b) Mathematical functions
(c) Thermodynamics
(d) Systems thinking: Stocks/flows/feedbacks
(e) Game theory/Nash equilibria
(f) Scientific method/ways of thinking

- The *Data* Behind Sustainability – An Overview
(*Serianni*)
(a) Population/consumption/equity
(b) Energy/energy cliffs
(c) Growth/economics/wealth/GDP
(d) Ecological footprint
(e) Food/ecosystem services
(f) Overshoot/collapse

*******Writing Assignment 1*******

- Jan 31 John Vucetich and Michael Nelson, *Sustainability: Virtuous or Vulgar?*
Rolston, Chapter 3: *Animals – Beasts in Flesh and Blood*
Rolston, Chapter 4: *Organisms – Respect For Life*
Aldo Leopold, *The Land Ethic*
(*Sitter*)
- Feb 5 Rolston, Chapter 5: *Species and Biodiversity – Lifelines in Jeopardy*
Rolston, Chapter 6: *Ecosystems – The Land Ethic*
Visit and Lecture by Michael Nelson (Environmental Ethics)
(*Sitter*)
- Feb 7 Rolston, Chapter 7: *Earth – Ethics on the Home Planet*
Ramachandra Guha, *How Much Should a Person Consume?*
(*Sitter*)
- Feb 12 Boyle, *A Friend of the Earth*
Part One (pp. 1-130): Historical & Political Background - 1970s to 2000
(*Sitter*)
- Feb 14 Boyle, *A Friend of the Earth* Part Two (pp. 131-250)
(*Sitter*)

*******Writing Assignment 2*******

Feb 19 Boyle, *A Friend of the Earth* Part Three (pp. 251-349)
(*Sitter*)

Feb 21 First Semester Exam
(Prof. Sitter traveling)

Feb 26 *Visit and Lecture by Jessica Hellmann (Biodiversity/Adaptation)*

Feb 28 Atmosphere/Climate
(*Serianni*)

Mar 5 Thermodynamics/Energy Sources
(*Serianni*)

Mar 7 Systems Thinking
(*Serianni*)

*******Writing Assignment 3*******

Mar 9 – Mar 17 Mid-Semester Break

Mar 19 *Visit and Discussion with Blaine Baker, Bakerlads Farm (Michigan)*
(*Serianni and Sitter*)

Mar 21 Randers, *2052*
Chapters 5 and 6
Energy and Food
(*Serianni and Sitter*)

Mar 26 Randers, *2052*
Chapters 9 and 10
Global Forecasts and Futures
(*Serianni and Sitter*)

Mar 28 Ozeki, *All Over Creation*, pp. 3-168
(*Sitter*)

Mar 29 – April 1 Easter Holiday

- April 2 Plant/Soil Science
(a) CO₂ fixation/photorespiration
(b) Nitrogen cycle/fertilizers
(c) Farming practices, soil erosion
- Energy Sources – Nonrenewables and Renewables
Basic concepts/principles
Brief discussion of BP Annual Report
(*Serianni*)

*******Writing Assignment 4*******

- April 4 *Visit and discussion with Dr. John Pierce (British Petroleum)*
- April 9 Ozeki, *All Over Creation*, pp. 169-309
Michael Pollan, “The Potato”

April 11 Second Semester Exam
(Prof. Serianni traveling)

- April 16 Ozeki, *All Over Creation*, pp. 313-417
(*Sitter*)
- April 18 **GDP/Economics/Wealth/Poverty/Equity?????**
- April 23 *Visit and Discussion with Prof. Matthias Ruth (Ecological Economics)*
Northeastern University
- April 25 Waste and Pollution/Cradle to Cradle
(*Serianni*)
(Prof. Sitter traveling)

*******Writing Assignment 5*******

April 30 Course Summary/Concluding Remarks
Randers, 2052 – Chapter 12
(*Serianni and Sitter*)

**May 7 Final Examination
Course Grading Metrics**

Writing Assignments (5): 20%
Semester Exams (2): 50%
Final Exam: 30%
Class Participation: 10%

Books on Reserve in Hesburgh Library

Lester Brown
Full Planet, Empty Plates
Norton, 2012

Richard Heinberg
The End of Growth
New Society Publishers, 2011

Jorgen Randers
2052: A Global Forecast for the Next Forty Years
Chelsea Green Publishing, 2012

Peter Bartelmus
Sustainability Economics: An Introduction
Routledge, 2012

Wenonah Hauter
Foodopoly: The Battle Over the Future of Food and Farming in America
New Press, 2012

Donella H. Meadows
Thinking in Systems
Chelsea Green Publishing, 2008

Donella Meadows, Jorgen Randers & Dennis Meadows
Limits To Growth – The 30-Year Update
Chelsea Green Publishing, 2004