

Appalachian State University, Department of Interdisciplinary Studies  
**IDS 3100 Science and sustainable development** (3 credits)  
Spring 2003

Class: MWF 10 - 10:50am  
Room: B-1 East Hall

Instructor: Christof den Biggelaar, Ph.D.  
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**Office hours:** Thursday 2 - 5 PM, and by appointment. Office hours are not scheduled to keep faculty occupied, but to provide students an opportunity to drop by with questions they are too embarrassed to ask in class, get additional explanations about the subject matter, ask questions about what and how to prepare for class, what the assignments are all about, for help with the mid-term project, whatever. So, make use of the opportunity.

### **Important considerations**

1. Students are expected to be aware of and follow the ASU's current "Code of Academic Integrity."
2. Incomplete grades are generally not given, and are granted solely at the instructor's discretion.
3. Papers are due at the scheduled beginning of class, and attendance is taken at that time. Tardiness will result in reduced credit; more than 5 unexcused absences will result in a failing grade.
4. Students are expected to read assigned texts and other materials BEFORE class and be prepared to discuss the material.

### **General outline**

Science is not well understood by many people as to its role in, and contributions to, society. Many people blame it for our present social and environmental problems. This course will explore the role of science in society, its contributions and consequences, and investigate what role it can/should play into making society and its development more sustainable. The course will use lectures, discussions and presentations to develop students' scientific and environmental (or eco-) literacy.

The course will use a collaborative learning format, in which people come together as equals and partners to envision, organize and offer active and relevant learning experiences for those involved in the course. Active student participation and involvement is required and key to the success of the course. There is plenty of room to share your ideas and opinions, and contribute your suggestions for readings and where to lead the discussion and our collective thinking.

### **Required background**

Courses which provide the necessary understanding of the economic, cultural, social, political and institutional factors affecting sustainability will be helpful but are not required. An open mind, the ability to listen and learn, and of thinking both outside and inside the box of your respective disciplines are desired.

### **Course objectives**

The primary objective will be to investigate the nature of science and its role in society, in particular its use and application to creating a more sustainable world. Students successfully completing the course should be able to:

- Discuss, describe and demonstrate an understanding of different issues relevant to sustainability, development, and sustainable development;
- Understand what science is and does, its role in society, and its contributions to a more sustainable society;
- Integrate concepts, ideas and approaches of the natural, social and life sciences in addressing projects,

programs and policies that bear on sustainable development;

### **Class format**

The class will have a seminar/discussion format, and meet two times a week. Attendance and active participation in all class activities is essential and required. Each student will be required to present and lead the discussion during one class period based on a book or articles of his/her choice related to the topic.

### **Text and readings**

1. Michael Zimmerman. 1995. *Science, Nonscience and Nonsense. Approaching Environmental Literacy*. Baltimore: Johns Hopkins Press.
2. Selected articles from special issues of *Nature* [Science and Sustainable Development, *Nature* 418 (August 22, 2002)], *Science* [The Challenge of Sustainable Development, *Science* 297 (August 9, 2002)], *A Sustainable Development Reader* [a collection of articles from previous issues of *Science*], and various reports, book chapters and journal articles. These articles can be accessed electronically at [www.sustainabilityscience.org](http://www.sustainabilityscience.org), via the ASU library webpage (*Science*), or can be found as hard copy in the ASU library journal collection in the basement.
3. Current articles, news stories and related readings may be assigned as deemed appropriate as supplemental reading for this course. Students are encouraged to bring appropriate material and share it with the class.
4. David W. Orr. 1992. "Two Meanings of Sustainability." In: *Ecological Literacy: Education and the Transition to a Postmodern World*, pp. 23-40. Albany, NY: State University of New York Press.
5. Alan Chalmers. 1990. "The aim of science" and "The social and political dimension of science" In: *Science and Its Fabrication*, pp. 24-39 and 115-125. Buckingham, UK: Open University Press.
6. Gregory N. Derry. 1999. "More practical questions: Science and society." In: *What Science Is and How it Works*, pp. 133-143. Princeton, NJ: Princeton University Press.
7. Todd Wilkinson. 1998. "Foreword, David Brower" and "Moonwalker." In: *Science under Siege: The Politicians' War on Nature and Truth*, pp. ix-xiii and 295-335. Boulder, CO: Johnson Books.
8. Fritjof Capra. 2002. "Epilogue: Making Sense." In: *The Hidden Connections: Integrating The Biological, Cognitive, And Social Dimensions Of Life Into A Science Of Sustainability*, pp. 261-268. New York: Doubleday.

### **Assignments/projects**

#### Reflection papers

A paper of one page maximum length on the week's readings, or on the student presentations about what you liked and did not in the author's /presenter's arguments.

#### Individual class presentation

Read a minimum of three articles, reports or book chapters from the list under 2 or 3. above, and write a critical review of your reading; you are encouraged to look through more recent issues of *Science* and *Nature* (or any other scientific journals) for relevant articles. You are to present an brief abstract and your review in class, and prepare a list of questions for discussion. Your review and list of discussion questions need to be handed in on the day you will lead the discussion.

#### Group presentation

Working in a small group of 3-4 students, prepare a vision of one aspect of a sustainable society (e.g., on agriculture and food, business, communication, land use, ...), outline how we will get there and how science can help/hinder. Prepare 4-5 questions/statements that will help with the discussion.

#### Term paper:

Write a 10-page term paper on the two questions that guided the course (What does a sustainable society/community look like? What is/can/should the role of science be to help us get and stay there?). The paper should be a personal exploration, reflecting your own thoughts and opinions based on what you learned from the readings and class discussions, but you can cite from the readings as necessary and

appropriate (use proper citations, though!). This paper is due on Tuesday May 6 (the scheduled final exam time).

### Requirements for written papers

1. Written papers are graded on scholarly quality, mastery of the material, conciseness, organization, use of readings, grammar and spelling. Style will be a consideration in grading.
2. Papers must be word-processed; title pages, plastic covers etc. are not required. Diagrams, drawings, and tables may be used as appropriate.
3. Any assignments turned in late will receive a lower grade. All assignments must be turned in to receive a passing grade for the course.

### Grading

Class attendance and participation	20 points
Reflection papers	15 points
Book/article report and presentation	25 points
Group presentation	15 points
Term paper	25 points
Quarter total	100 points

### Class schedule

<u>Date</u>	<u>Topic</u>	<u>Readings</u>
January 13	Course introduction and overview	none
January 15	What is science?	Chalmers, 24-39
January 17	What is science? (Cont.)	Zimmerman, Preface and Chapter 1
January 20	MLK holiday	
January 22	Why do we need to understand science?	Zimmerman, Chapter 2
January 24	Understanding science	Zimmerman, Chapter 3
January 27	Political influence of science	Zimmerman, Chapter 4
January 29	Political influence of science (case study)	Wilkinson, 'Moonwalker'
January 31	Science and society	Derry, pp. 133-144
February 3	Sustainability	Orr, 'Two meanings of sustainability'
February 5	Global environmental problems	Zimmerman, Chapter 5
February 7	Endangered species	Zimmerman, Chapter 6
February 10	Better living through chemistry	Zimmerman, Chapter 7
February 12	Food and agriculture	Zimmerman, Chapter 8
February 14	Land of many abuses	Zimmerman, Chapter 9

February 17	Technology will save us	Zimmerman, Chapter 10
February 19	Science, society and sustainable development	Lubchenko, Science 279 p. 491 Merkel, Science 281 p. 336 Kates, Science 292 p. 641 Day, Nature 389 p. 247-248 Nature 395 p. 527
February 21	Science, society and sustainable development	Clarke, Nature 418 p. 812-814 Triendl, Nature 405 p. 501 Daily & Walker, Nature 403 p. 243-254 Nature 402 p. 4-6 Schellnhuber, Nature 402 p. C19-C23
February 24	Student-led discussion	TBD
February 26	Student-led discussion	TBD
February 28	Student-led discussion	TBD
March 3	Student-led discussion	TBD
March 5	Student-led discussion	TBD
March 7	Student-led discussion	TBD
March 17	Student-led discussion	TBD
March 19	Student-led discussion	TBD
March 21	Student-led discussion	TBD
March 24	Student-led discussion	TBD
March 26	Student-led discussion	TBD
March 28	Student-led discussion	TBD
March 31	Student-led discussion	TBD
April 2	Student-led discussion	TBD
April 4	Student-led discussion	TBD
April 7	Student-led discussion	TBD
April 9	Student-led discussion	TBD
April 11	Student-led discussion	TBD
April 14	Student-led discussion	TBD
April 16	Student-led discussion	TBD

April 18	Envisioning a sustainable society	Zimmerman, Chapter 11 Capra, Epilogue: Making Sense
April 23	Envisioning a sustainable society: group presentations	
April 25	Envisioning a sustainable society: group presentations	
April 28	Envisioning a sustainable society: group presentations	
April 30	Envisioning a sustainable society: group presentations	
May 6	Course wrap-up, questions, fun; term papers due	Venue: Dutch Creek farm