

Economics 154-326A  
ECOLOGICAL ECONOMICS  
Autumn 2020 Syllabus

**Class Times:** Mon, Wed. 11:30-12:55

Virtual office times Leacock Bldg 321D to be announced

**Instructor:** R. T. Naylor

Teaching-Assistant: **Michael Babcock**  
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*Students need to understand the meaning and consequences of cheating, plagiarism, and other academic offenses under the Code of Student Conduct. Students can submit written work in English or French. If you have a disability – **confirmed in writing by a professional** - that might affect your academic work, Professor Naylor will find a reasonable accommodation to help meet your needs **while respecting the structure and timetable of the course.***

*In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change. All slides, video recordings, lecture notes, etc. remain the instructor's intellectual property. As such, you may use these only for purposes of your own learning (and research, with proper referencing/citation). You are not permitted to disseminate or share these materials; doing so may violate the instructor's intellectual property rights and could be cause for disciplinary action. By enrolling in a remote course, you accept that fixed sessions will be recorded.*

*You must consent to being recorded if you attend a lecture or participate in a component of a course that is being recorded. If you are not comfortable being in a class that is recorded, you may decide to not take part by logging off Zoom. Students who log off will be able to later watch the video recording in MyCourses.*

*For pedagogical reasons and for the enrichment of the experience of all students, attendance may be monitored and/or active participation may be expected or required during fixed (synchronous) class time. As such, you may be asked to turn on your camera and audio. **If you do not have the necessary resources (e.g., adequate Internet bandwidth or equipment) to do so, inform your instructor at the beginning of term so appropriate accommodations can be made.***

*In addition to the recording of your image and voice, your name (or preferred name) may be displayed on screen, and your instructor may call your name during the lecture. As such, this personal information will be disclosed to classmates, whether during the lecture or in viewing the recording. By remaining in classes that are being recorded, you accept that personal information of this kind may be disclosed to others, whether during the lecture or when viewing the recording.*

### COURSE RATIONALE AND OBJECTIVES

Ecological (AKA biophysical) economics differs in intent, perspective, and analytical method from mainstream economics. Environmental economics, for example, focuses on micro level “optimization;” while the main job of macro-economics is understanding, maintaining, and if possible accelerating “growth” at the economy-wide level. By contrast biophysical economics studies economic activity in terms of not just “resources” or “markets” but also the consequences for the biosphere as a whole. So its main concern is not production or distribution at the micro or macro level but dealing with depletion and pollution on a global scale.

*In other words the ecological perspective asks how much damage ecosystems, on which human economy and society both depend, can tolerate before catastrophic breakdown occurs. To that question there is no simple response. However this course offers some tools and a multi-disciplinary perspective to help find at least a partial answer.*

### **NOTE CAREFULLY**

1) Course **prerequisites** are **six** credits of **university level** economics, **both micro and macro with a grade C or better - no exceptions. Furthermore those with less than a solid B are advised to avoid the course.** You can't understand limitations of conventional economics unless you know what it is.

2) There are no "textbooks." **Core** material is available *in lectures. Attendance (real or "virtual") is essential.* The "slides" (updated year by year) on MyCourses are an outline of more technical and complex lectures. Real learning requires activating your eyes, ears, hands, and brain; you need to see material on the screen, listen to it being explained, take careful notes, and think about what you heard and saw. Just gawking at a screen means you are fooling yourself.

3) Other sources, expanding and explaining further contents of lectures, will be accessible via **MyCourses**. Each module has several additional items for study. Scan the material there and *decide for yourself what best supplements your existing knowledge or provides the best lead for your written work.*

4) **Some** background knowledge of **ecology is important.** Students can check any *introductory* ecology book or **better still** follow the 12 unit (about 10-12 minutes each) excellent crash course that explains core concepts and their usage.

[https://www.youtube.com/results?search\\_query=crash+course+ecology.](https://www.youtube.com/results?search_query=crash+course+ecology)

**Grading Procedures:** in rising order of importance.

**A: Op-Ed or Book Review Option (30%)** to be submitted **late September BOTH 350 word max format WORD 12 point type NO PDF's.**

For the **Op Ed** exercise see detailed instructions in the first module on MyCourses on the purpose, audience, limitations, and **Learning Objectives**. Subjects can be authorized by Professor Naylor before or after class or in his office in Leacock 326D (time to be determined) or by e-mail to the TA.

For those choosing the **Book Review Option** there are many guides on the Internet. Any reasonable format used by major publications is possible; look, for example, at book reviews in well-established sources like the *London Review of Books*. More generally see <https://writingcenter.unc.edu/tips-and-tools/book-reviews/> See the list below on page 4 of permitted books, a list that grows over time; others are possible with permission of Professor Naylor or TA Michael Babcock. You ought to also seek advice from Michael David Miller, the librarian handling this course. *Make sure you use technical terminology correctly along with proper grammar and orthography.*

**B: In-Class Test (Mid October).** **Learning Objectives** are to test understanding of core concepts necessary to understand other material. The test requires either very precise short answers or sometimes simply true or false choices. (30%). Date of the test will be announced: late September or early October.

**C: Case Study (to be submitted by last day of term in WORD 12 point type NO PDF's (40%).** **The topic needs to be DIFFERENT from your OpEd.** Each student will prepare a **five-**

**page analytical text plus no more than two pages for references, charts, or diagrams.** They will use the frameworks taught in class - circular flows of matter and energy, cycles of life, how entropy manifests itself in the time and space etc. - to discuss a current environmental problem that is the consequence of human engineered energy and material flows into **and** out of the former economy of nature.

Your analysis should be economically driven with careful regard for environmental and social consequences, both long and short term, both proximal and distal from the centre point of impact of the problem. A specific subject could be a metallic ore, a vital type of plant, a particular species of insect facing new problems because of human exploitation, direct or indirect. And so forth. The world is wide open for choices of subjects: animal, vegetable, mineral and the resulting impact. It is better to pick something localized and/or regional, but your analysis may tentatively predict ultimate large-scale distant consequences from too much reproduction of the particular example. *If you need clarification and inspiration look for a google picture of Bingham Canyon Mine.*

In other words, consider scale and scalability of both the issue and its consequences. Pay attention to habitat (natural or synthetic) plus material stocks, energy flows, toxin production, waste accumulation, and life cycles that affect not simply energy and material at a **given** stage of production but well beyond. *Remember that the overriding theme of the course is that the human economy today, in its methods and appetites, ultimately turns nature into garbage.*

Since all students will be engaged in a parallel form of exploration there is plenty of room for informal groups to cooperate among themselves doing similar but not identical projects. The role of social movements can figure in your analysis; *but the focus is on entropic trends.*

### **D: READINGS**

*There are a number of quasi-textbooks for ecological economics, some beyond the level of a 300 course. A good starting point is Herman Daly & Joshua Farley **Ecological Economics: Principles and Applications**. You will be expected at the start of the course to familiarize yourself with the **first three chapters** in an essential process of learning limits of standard economics; and also other chapters noted in the Econ 326 Modules on MyCourses. This book is available as an e-book in the library so you can request prints of core chapters.*

*Some other books worth perusing though too technical for book reviews) include:*

**Charles Hall & Kent Klitgaard *Energy and the Wealth of Nations***, downloadable free at: <https://link-springer-com.proxy3.library.mcgill.ca/book/10.1007%2F978-1-4419-9398-4> Specific chapters will be recommended at particular stages of the course. They are also available on MyCourses. **There is now a new edition but stick to the older one for the time being.**

**Juan Martinez-Alier *Ecological Economics: Energy, Environment and Society*** looks at some precursors of the thinking embodied in the subject.

**Stanislav Shmelev *Ecological Economics: Sustainability in Practice*** probably the most accessible of the more technical recent works.

**Blair Fix *Rethinking Economic Growth Theory From a Biophysical Perspective*** requires a reasonable grounding in calculus and macro-economic theory.

**Nicholas Georgescu-Roegen *The Entropy Law and the Economic Process*** the most important book in development of ecological economics; its math and physics are sometimes complicated and its grammar and sentence structure somewhat difficult to parse. More comprehensible Georgescu-Roegen's articles are in one of the last MyCourses modules.

**Vaclav Smil** is perhaps the most learned contemporary person on the interface of energy, economy, and environment. His *many books* vary for various audiences. Some are short and easy to read, especially *Energy* and *Oil*, both written as intros: these are NOT appropriate for book reviews. **Those with a broader sweep certainly are. Discuss this with Professor Naylor or Michael Babcock.**

### **MODULES:**

Each “module” in MyCourses relates to a particular class although there are many loops and feedbacks. (You might say that the course, rather than following a linear path, is itself a complex self-organising system.) **All** material on MyCourses is selected to complement and supplement lectures. Each module contains several items material that can clarify or extend different elements raised in the classes. They **all** contain facts or concepts useful for written and oral work. ***Keep in mind that you must understand the forces, human and natural, acting on the globe, their trajectories over time, and their implications, or you will be simply repeating pop slogans.***

### **SOME KEY CONCEPTS TO BE UNDERSTOOD AND USED PROPERLY!**

(It is useful to keep a file of concepts with which you are not familiar so you can find them quickly and correctly. Some examples below:

Bio-geo-chemical cycles  
 Carrying capacity  
 Bioaccumulation  
 Ecosystem services  
 Limiting factors  
 Environmental footprint  
 Energy carriers, conversions, efficiencies etc.  
 Closed-loop versus linear-throughput systems  
 Entropy (the scientific, not the pop, meaning)  
 Dynamic systems thinking  
 Path dependent behavior  
 Multi-criteria evaluation versus single-metric approaches  
 Mass balance analysis and industrial metabolism  
 Toxic garbage vs. ecosystem waste

**PLUS other concepts explained in the videos noted above or in your ecology book.**

### **E: Other Operational Rules:**

- 1) *In the event of extraordinary circumstances beyond the University’s control, the content and/or evaluation scheme in this course is subject to change.* Failure to meet deadlines without a properly documented medical or similar note issued by a competent professional authority (not just a university bureaucrat) can mean penalties up to and including a mark of zero on late or absent work. Plan your timetable.
- 2) I am available for students Tuesday afternoon in my **Leacock** building office, with hours to be announced once the start-of-term chaos settles. For those who choose to take the Macdonald Campus section of this course in second term, I will be available at the **Mac Campus** on Wednesdays before and after class in the Barton Building **classroom** or in **The Link**. If we are lucky enough to have full access, you can also work before and after

classes in the library just past the **Link**. Its collection of information on subjects we deal with is very good.

- 3) Now here is a rule you will not like. I am so flooded with e mails many are simply deleted or automatically sent to the junk folder; so do not send them except in times of genuine need; that category does NOT include you missing deadlines by misallocating your time. You are expected to attend class, *however it exists*, where you can ask questions before, perhaps during, and certainly after.

**F: Brief List of Potential Books for Review. Other options must be cleared with Professor Naylor at least two weeks before submission. Bring a copy when you see him; if you are not in Montreal send your idea (and its justification) to Professor Naylor or Michael Babcock by e mail!**

Vernon Carter & Tom Vale *Topsoil and Civilization*

William Catton *Overshoot: the Ecological Basis of Revolutionary Change*

Alfred Crosby *Ecological Imperialism: the Biological Expansion of Europe 900-1900*

Arther Ferrill *The Origins of War*

Carmel Finley *All the Fish in the Sea*

Jacob Hamblin *Arming Mother Nature: The Birth of Catastrophic Environmentalism*

Donald Hughes *Ecology in Ancient Civilizations*

Nancy Langston *Forest Dreams, Forest Nightmares*

Susan Lanier-Graham *The Ecology of War*

Timothy Lecain *Mass Destruction: the men and giant mines that wired America and scarred the planet*

Konrad Lorenz *On Aggression*

J.R. McNeill *Something New Under the Sun: An Environmental History of the Twentieth-Century World*

William McNeill *Plagues and Peoples*

Alan Moorehead *The Fatal Impact*

John Perlin *A Forest Journey: the Story of Wood and Civilization*

Steven Pyne *Vestal Fire: An Environmental History Told Through Fire* (magnificent, over-long!)

Oliver Rackham *History of the Countryside*

Callum Roberts *The Unnatural History of the Sea*

Edmund Russell *War and Nature*

Marshall Sahlins *Stone Age Economics*

Richard Tucker *Insatiable Appetite: the United States and the Ecological Degradation of the Tropical World*

Donavan Webster *Aftermath: the Remnants of War*

Alan Weisman *The World Without Us*

Donald Worster *Rivers of Empire: Water, Aridity, and the Growth of the American West*

**List still in Progress: use your imaginations, and check with Michael David Miller at the library for anything not immediately available via the existing Library holdings. BUT do not forget the point of the course and divert your work into a dead end. All of the above books have something important to say about the themes of the course but that does not mean they are always right.**