Economics 154-326A
ECOLOGICAL ECONOMICS
Winter 2020 Syllabus

Class Times: Wed. 1:05 -3:55
Barton 1-015
Macdonald Campus

Instructor: R. T. Naylor
Leacock Bldg 321D

Students are required 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 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.

COURSE RATIONALE AND OBJECTIVES
Ecological (AKA Biophysical) economics differs considerably 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 biosphere as a whole. Its main concern is not production or distribution at the micro or macro level but dealing with the resulting depletion and pollution on a global scale. In other words it asks how much damage ecosystems, on which the economy and human society itself depends, can tolerate before breakdown occurs. To that question there is no simple response. But this course offers some tools and a multi-disciplinary perspective to help grope for an answer.

NOTE THE FOLLOWING CAREFULLY
1) Course prerequisites are six credits of university level economics, both micro and macro. There are no exceptions. You can’t understand or pretend to transcend the limits of conventional economics unless you know what it is.
2) There are no “textbooks.” Core material comes from lectures and other sources accessible via MyCourses.
3) Lecture contents are available only in lectures. The “slides” (which are radically updated year by year) are NOT on MyCourses except in technical and complex cases. Attendance is essential.
4) Some background knowledge of ecology is critical. Students lacking that can check almost any introductory ecology book or follow the 12 unit (about 10-12 minutes each) crash course: https://www.youtube.com/results?search_query=crash+course+ecology. It is excellent and enjoyable. Each unit ends with a short list of core concepts, important for your course performance including your term test in early February 2020.
5) Marking is in three units
   a) a Class Test on core concepts explained in early modules: (25%)
   b) a 350 word (max) Op-Ed style essay (fully explained on MyCourses in the syllabus section): (25%)
OR alt b) a 350 word (max) critical book review of a work on a list of options given below in Section D. Check the format used by book reviews in well-established sources like the London Review of Books. These are available in the library – and you can also as advice from Michael David Miller who is the librarian handling this course. He is extremely helpful and very much on
top of the contents of the library and where to find the information you need to understand high quality book reviews. It is a talent student these days rarely cultivate – and believe me it is much more educational than just punching Google. You can pick another book but it MUST be cleared by Professor Naylor in person.

c) a formal Case Study (see rubric on MyCourses and instructions in this syllabus) max 5 pages plus max 2 for references and diagrams. (50%) Time permitting you may be asked by the instructor to give a 10 minute summary of your case and to answer class questions. In that event you can be graded 40% on the written case and 10% on the quality of your presentation and answering of questions. You will have the option of refusal and go just for the 50% option.

In other words you are graded on: 1) a short-answer based test of technical concepts from the early modules; 2) a popularly-written but factually accurate short item directed at interested but not necessarily well informed citizens, which could take one of two different forms, an exposition for a journal or a book review of the quality of a journal specializing in those reviews; 3) a formal analysis of a particular environment problem (DIFFERENT from your OpEd topic or book review) plus (if you choose) defense of your analysis in front of the class.

READINGS
There are plenty already in the modules. But students ought to look at specific chapters that seem relevant at particular stages of the course in Charles Hall & Kent Klitgaard Energy and the Wealth of Nations, downloadable free at:
Think of it as as close to a textbook we have in the course – but it is no substitute for the material in the modules.

There are now a number of quasi-textbooks for ecological economics, some beyond the level of a 300 course. But some that are well worth perusing include:

Herman Daly & Joshua Farley Ecological Economics: Principles and Applications the closest book to achieve something of a synthesis of orthodox and ecological economics, though its sympathy is with the second.

Juan Martinez-Alier Ecological Economics: Energy, Environment and Society that looks at some of the 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 is perhaps the most important single book in the development of ecological economics, its math and occasional reference to physics are not too complicated, but (since he was writing in perhaps his fourth language) the grammar and sentence structure can be difficult to parse. There will be a batch of more comprehensible Georgescu-Roegen’s articles in one of the MyCourses modules.

Also recommended are books by Vaclav Smil – of which there are perhaps 40! He is likely the most learned person to examine over time the interface of energy, economy, and environment. He also has some excellent easy to read short (beginners guide) books, especially
the ones entitled *Energy* and *Oil* respectively. For those interested in deep ecology see his beautifully presented *Cycles of Life*.

**MODULES:**
Each “module” in MyCourses relates to a particular class (in fact for the Mac section we might cover two module topics per class – since we have half the classes and twice the time for each than the downtown section. Within the modules there are many loops and feedbacks. All material on MyCourses is selected to complement and supplement lectures. Each module contains several items of reading material; but in general the ones listed at the top are particularly significant; the rest help to clarify or extend different elements raised in the first one or two. Pay attention to **key concepts** in lectures and readings required for your written 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.**

**NOTE:** In Module “Energetics and Systems” the final item “A Note on the Role of Energy in Production” ought to be studied carefully in its FIRST FIVE PAGES. Students with some familiarity with production theory will benefit from the entire paper. But any test questions will focus on the concepts up to equations 1-10. **This is not a math exercise; it is to ensure your understanding of core ideas and their importance in real world economics. I went over it quickly in the first class and will return to it on Wed. Jan. 15, time permitting.**

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

**PLUS other concepts explained in the videos noted above or in your ecology book The first is the easier route but either can be partly replaced with the submodule in module 1 Introduction to Earth Sciences created by the former TA in this course. MAKE SURE you understand and use properly concepts in your work. Your success in the class test, the Op-Ed, and the case-studies depends on it. Note down key concepts and ensure you understand how to use them properly.**

**Assessment Process Rules**
*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.

Summary of Requirements and Timing (which can occasionally be revised if necessary.)

A: Op-Ed (submitted Feb. 12 in WORD 12 point type NO PDF’s) See detailed instructions on the purpose, audience, limitations, and Learning Objectives of the Op Ed exercise in the first module. Op-Ed subjects can be authorized by Professor Naylor before or after class at Mac or in his office Leacock 326D - Tuesday afternoon is best but I am in class until 2:30. (25%)

Book Review Option (same submission dates and requirements). There are many guides available on the Internet. Any reasonable format used by major publications noted for their reviews is possible, but as one example try: https://writingcenter.unc.edu/tips-and-tools/book-reviews/ See the list of permitted books also in this module.

B: In-Class Test (Feb. 26). Self explanatory. Learning Objectives are to test knowledge and understanding of key and fundamental concepts necessary to understand other material. The test requires either very precise short answers or sometimes simply true or false choices. (25%)

C: Case Study (March 25 submitted in WORD 12 point type NO PDF’s) Each student will prepare a five-page analytical text plus no more than two pages for references, charts, or diagrams. They will use the classroom frameworks - circular flows of matter and energy, cycles of life, and how entropy manifests itself in the time and space - to discuss a current environmental problem that stems from embedding human engineered energy and material flows into the former economy of nature. (The topic needs to be DIFFERENT from your OpEd)

Your analysis should be economically driven with careful regard for the environmental and social consequences, both long and short term, both proximal and distal from the centre point of the problem. A specific subject could be a metallic ore, a vital species of plant, or even a common species facing new problems because of human exploitation, direct or indirect. The role of social movements can figure in your analysis; but the focus is on entropic trends. Don’t go off on tangents. This is an exercise in hard fact and excellent logic, not just a set of clichés or a blowing off of steam.

Consider too the scale and the scalability of both the issue you are examining and its consequences. Pay attention to habitat (natural or synthetic) plus material stocks, energy flows, toxin production, waste accumulation, and life cycles that can affect not simply energy and material at a given stage of production but well beyond. For example the impact of pesticides is not just on target species but on other living things including humans be they producers, consumers, or just unfortunates dealing with the resulting garbage. Consider also the time dimensions in various environmental problems and crises.

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. (50% for just written form; or 40% written plus 10% for presentation as explained above: your choice must be made formally by the end of January; the default is the 50% rule.)

D: Other Operational Rules:

I am available for students most of Tuesday in my Leacock building office except from 11:30-2:30. I will be there until 5:30. I will also be available at the Mac Campus on Wednesdays
before and after class. I do not have an office there but we can meet before or after class in the Barton Building classroom (assuming no other class is before us) or in The Link, the student cafeteria in the Macdonald Stewart building attached to the Barton Building. It is just a hike up one flight of stairs from the classroom. You can also work before and after classes in the small but quiet library accessible just past the Link. Its collection of information on subjects we deal with is quite good.

Now here is a rule you will not like. I do accept e mails from students ONLY in genuine emergencies – that does NOT include you missing deadlines because you misallocated your time. You are expected to attend class, and I am so flooded with e mails many are simply deleted or automatically sent to the junk folder. So submission of essential materials is in paper form by yourself or a friend, or else placed in my mail-slot in the Economics Dept. office on the fourth floor of Leacock. The exception is the in-class test that you return to me at the end of the test period.

E: Potential Books for Review. Other options must be cleared with Professor Naylor at least two weeks before submission. SEE separate List on the Syllabus section of My Courses. It ought to be done by this coming Weekend.