

## ERS 410: CAPSTONE COURSE OUTLINE

# Transforming Eco-Social Systems: Sustainability for ‘the Long Now’

## Winter 2015

### PLEASE NOTE:

DRAFT & SUBJECT TO CHANGE...PLEASE ALWAYS CONSULT  
LATEST VERSION. I WILL ALWAYS POST NOTIFICATION OF  
ANY CHANGES

Imagine that you could look at the Earth and the universe from a vantage point outside space and time. Imagine that you could press a re-wind button ... and go all the way back? What would you see? What would be the most significant features of cosmic history in reverse? Great episodes such as World War I or the French Revolution would disappear into a blur. A series of more significant punctuations would come into view: modernity and the connecting up of a global human culture; agriculture and the emergence of the first cities; fire culture and language; the Cambrian explosion and multicellular organisms; the evolution of life; the creation of planets and solar systems; the birth of stars...the big bang.

That is a lot of history and seemingly an impossibly large canvas. How can such a big picture help us to navigate the social and ecological problems of the twenty-first century?

Although all species eventually become extinct, most manage to stay the course for around two million years. In the long view, sustainability is about whether humanity manages to live out this evolutionary potential. For this reason it should not be measured in decades or even centuries, but rather millennia and aeons. Longer than recorded history, such a time-scale is difficult to conceive, let alone to operationalize at the level of politics. But this is the task facing the current generation and their great grandchildren. The problem is made more difficult by the fragmentation and increasing specialization of scientific knowledge that makes it difficult see the big picture. At the same time, without a shared, taken-for-granted religious worldview it is also difficult to find meaning and significance in the world.

Using Big History as a point of departure, this capstone course is designed to ‘join the dots. Reflecting and synthesising learning from across the full breadth of ERS courses, students will focus on the big picture of humanity’s relationship with non-human nature. At the same time, students will contribute to the development of a ‘legacy course’ for the Department. Rooted in this shared orientation to the big questions, the legacy course will consolidate an identity and shared mission among successive cohorts of ERS students and develop practical projects within the wider UW and KW communities.

## 1. COURSE INFORMATION

Professor: Stephen Quilley

Contact: *Email:* [squilley 'AT' uwaterloo.ca](mailto:squilley@uwaterloo.ca)

*Tel:* (519) 888-4567 Ext. 38335

*Office:* EV2 2009

*Office Hours:* tbc

*Contact:* Ask questions during the lecture or ask your TA. If they are not able to answer your questions they will forward them to me. For attendance issues please talk to your TA. Email is always best in the first instance.

Teaching  
Assistants:

Katie Weedmark-Kish

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Kaitlin Rathwell

[K2rathew@uwaterloo.ca](mailto:K2rathew@uwaterloo.ca)

Kristen Giesting

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Lecture: Thurs 12.30 - 2.30pm

Tutorials: 102-Tut - Wed: 1:30-2:20pm ML216

103-Tut - Wed: 4.30-5.20pm HH123

104-Tut - Wed: 4.30-5.20pm HH124

105-Tut – Mon: 3.30-4.20pm AL210

**YOU MUST ATTEND TUTORIALS (PLEASE CONFIRM TIME, VENUE AND REGISTRATION YOURSELF)**

Readings:

Books will be in the reserve collection. Students are advised to photocopy (obeying copyright laws), and share as appropriate. Readings will also be posted on LEARN. There is no course fee for 'Courseware.'

Users can login to LEARN via: <http://learn.uwaterloo.ca/> (use your WatIAM/Quest username and password)

Documentation is available at:

[http://av.uwaterloo.ca/uwace/training\\_documentation/index.html](http://av.uwaterloo.ca/uwace/training_documentation/index.html)

- Communications: I will communicate using emails through LEARN. Emails will go to your UWaterloo account (see IT services on how to forward UWaterloo emails to other accounts).
- Dates: TBC **There will be a lecture but NO TUTORIAL in the first week of the semester.**
- Advice: Please enter the dates of the various assignments into your calendar now. Give yourself a long lead-time and start working on each assignment weeks in advance.

## 2. COURSE OVERVIEW

ERS410 is the capstone course in the Department of Environment and Resource Studies. The course will provide a vehicle for reflection and synthesis, allowing students to integrate themes, bodies of knowledge and learning experiences accumulated over course of the degree programme. This will be achieved in four ways.

- i. **BIG HISTORY:** The lectures will focus on really big questions, placing human endeavours and problems into the overarching context of cosmic evolution. This framework, which David Christian (2005) calls 'big history', is presented as a scientific 'origin myth. Such a myth is necessary to anchor meaning and provide a sense of the significance of human endeavour, which might otherwise seem fleeting and meaningless when seen against the infinite universe. Big History makes sense of both ecological and social complexity as dimensions of a much broader thermodynamic order, which is evident in the unfolding universe at every spatial and temporal scale. Understanding our place in the universe in this way allows us to recognise as fellow travellers, not only our immediate kith and kin in the natural world (mice, monkeys, blue-green algae and viruses et al.), with whom we share a common genetic inheritance, biochemical machinery and an ecological household – but also in more unlikely entities such as quarks, quasars and stars. Narrowing the timeframe to the 'Long Now' of human development, this relationship between energy throughput and complexity is applied to what Elias called 'the process of civilisation' (1939): the interweaving co-development of controls over the self (psychology and personality structure), over others (social complexity and the division of labour) and over nature (ecological transformation). On this basis, the problem of sustainability is reframed in terms of (a) complexity as a locus for signification and ontological meaning (b) a tension between complexity in economy and society and complexity in natural systems, and (c) the internalisation of very

long time horizons into human 'steering systems' (including culture, religion, spirituality governance, politics, policy, institutions).

- ii. ECOLOGY, ECONOMY, TIME: All of the environmental problems, with which students have become very familiar, can be understood in terms of energy and material **throughput** and as a problem of **scale** (the ratio of economy/ecology) i.e. a mismatch between the scale and temporality of human activities and those of non-human ecological systems. The lectures will consolidate student understanding of this tension and draw attention to the practical consequences for any truly long term vision for a sustainable relationship between economy and ecology, the 'anthroposphere' and the biosphere.
- iii. DIVERGENT FUTURES AND DISRUPTIVE TECHNICS: The twenty first century will be a bottleneck in human development. The long-term future of any kind of science-based, globally connected civilisation is far from certain. Resource and energy strain could certainly lead to a significant process of collapse and consolidation at much lower level of technological and social complexity. Climate change could even result in the eventual extinction of the human species, along with the countless others whose fate is already (sadly) guaranteed. On the other hand, if we manage to secure into 'the long now', the future of a complex, globally-connected, science-based civilisation – then humanity could flourish for millennia to come. In flourishing, our species might also come to play the sentient, organising brain for a reflexive and self-aware biosphere. But to achieve what James Lovelock has referred to as a 'Gaian civilisation', humanity has to solve one very difficult problem: how is it possible to sustain a complex material culture involving high rates of technological innovation and an extensive social and technical division of labour, whilst at the same time radically reducing the underlying flows of energy and materials upon which all human activities depend. Exploring this problem, the lectures will juxtapose different scenarios for human development over the next century. Focusing on the 'wicked' problem of consumer society and consumerism as a resilient and expanding social-ecological system, the lectures will outline possibilities for radical techno-social innovation.

### 3. READING LIST

The reading list is to be confirmed by January. A separate document will be loaded on the LEARN site.

Students wishing to prepare for the class over Xmas should start by looking at the following texts.

Spiers, F. (2010) *Big History and the Future of Humanity* (Oxford: Wiley Blackwell)

Christian, D. (2004) *Maps of Time: An Introduction to Big History* (Berkeley, CA, University of California Press)

#### 4. LEARNING AIMS AND OBJECTIVES

By the end of this course, you will be able to:

- Apply the time horizons of Big History to the problem of sustainability
- Demonstrate your understanding of the relationship between energy and complexity
- Demonstrate a conceptual understanding of the relationship between human institutions and the kind of steering implied by the 'the Long Now'
- Frame humanity's long-term ecological dilemma as a problem of metabolic scale
- Recognize and articulate the issue of (over)consumption as a 'wicked' (paradoxical, not 'bad') problem.
- Articulate an overview of the big picture implicit across the breadth of ERS courses.
- Describe the role and function of a 'legacy course' in a university environment.
- Identify the potential, impact and possible content of a legacy course in ERS.
- Imagine a completely new relationship between humanity and the biosphere, recognize kinship and complicity with a much wider array of entities, biophysical processes and phenomena and conceive of the human project within the extended time horizons of 'the Long Now.'

#### 5. TUTORIALS

As well as conventional discussions of set readings, tutorials will include student Powerpoint presentations and a variety of exercises. Some of the exercises will be reproduced in a more polished form and submitted as part of the PORTFOLIO, and in one case as a separate ART/SPIRITUALITY/MEANING assignment (see below).

In seminars students will be divided into 4 teams (A,B,C and D). The administration of this process is up to the Teaching Assistant. In most cases a team will work together throughout. Many of the sessions will involve working first of all in teams, reporting back to the group and then a final group discussion or exercise.

6. LECTURE AND TUTORIAL SCHEDULE: See 'ERS410 At a Glance'

7. ASSESSMENT

Full details of the assignments will be made available on the LEARN site at the start of the semester. Assignments consist of:

Summary	
Assignment	Due Date
<p>1. Term essay (35%)</p> <p>Students will submit a 2000 word paper, with a title chosen from a list provided by the instructor and available on the LEARN site. This assignment is due (TBC – end of Semester). PLEASE NOTE: THIS PAPER SHOULD BE SUBMITTED ELECTRONICALLY THROUGH LEARN BY</p>	Friday March 27 <sup>th</sup> Week 13
<p>2. Meaning seeking and making (30%)</p>	<p>Submission to TA at tutorial in Week 10 (week beginning Monday 9<sup>th</sup> March)</p> <p>Display/performance at Envigorate Festival in EV3, March 27<sup>th</sup> (with permission – see Katie Kish)</p>
<p>3. Portfolio- short answers (35%)</p> <p>The Portfolio will consist of 5 exercises (A-E) from the tutorials, written up and handed in together, to the TA at the tutorial in Week 12. The relevant exercises will be indicated in the Tutorial Schedule. PLEASE NOTE: <i>The final component, a book review is indicated in later in the semester but you are strongly advised to start on this element by week 3.</i></p>	<p>Exercises to be hand in weekly (see <i>ERS410: At a Glance</i> schedule) and with FORMAL SUBMISSION to TA in Tutorial in Week 12 (week beginning Monday 16<sup>th</sup> March)</p>



<p>ADEQUATE C+ to C-</p>	<p>C+ 67-69 C 63-66 C- 60-62</p>	<p>Writing is largely descriptive with little or no probing, analysis or critique..</p> <p>Poor or partial understanding of concepts and theories along with significant errors.</p> <p>Evidence of only limited reading.</p> <p>Poor writing skills (lack of structure, poor composition, poor sentence structure, problems with paragraphing etc.)</p> <p>Frequent spelling and grammatical errors</p> <p>Some problems with citation, referencing and the presentation of a bibliography.</p>
<p>INADEQUATE D+ to F</p>		<p>Little or no understanding of the concepts and theories.</p> <p>Evidence of little or no reading.</p> <p>Poor writing skills with systemic grammatical and spelling errors.</p>



## MEANING SEEKING& MAKING: MARKING RUBRIC

This is only indicative. The breadth of the exercise doesn't lend itself to a precise rubric.

	EXCELLENT					INADEQUATE
<b>IMAGINATION</b>						
Meaning: Human or psychological dilemma/question/problem clearly intimated or captured						
Piece 'stands alone' and needs no additional explanation						
Emotional/spiritual resonance						
<b>APPEARANCE/EXECUTION</b>						
Effective use of chosen medium						
Attention to detail						
Obvious thought and reflection						
Sources (as necessary) adequately acknowledged with accurate citations						
Creativity						

### 8. COURSE POLICIES

- **REFERENCING:** All written work should use the standard APA/Harvard referencing system.
- **SPELLING, STYLE, GRAMMAR, COMPOSITION:** I take this seriously and so should you.
- **ELECTRONIC SUBMISSIONS:** When submitting files, please use user-friendly and descriptive file names (e.g. Quilley- 410-ESSAY2.doc).

### 9. NOTES FOR PERSONS WITH RELIGIOUS BELIEFS AND /OR DISABILITIES

**Note for students with disabilities:** The Office for Persons with Disabilities (OPD), located in Needles Hall, Room 1132, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the OPD at the beginning of each academic term.

**Religious Observances:** Please inform the instructor at the beginning of term if special accommodation needs to be made for religious observances that are not otherwise accounted for in the scheduling of classes and assignments.

#### 10. PLAGIARISM, STUDENT CONDUCT AND ACADEMIC INTEGRITY

**Academic Integrity:** In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [www.uwaterloo.ca/academicintegrity/](http://www.uwaterloo.ca/academicintegrity/). Students who are unsure what constitutes an academic offence are requested to visit the on-line tutorial at: <http://www.lib.uwaterloo.ca/ait/>

**Research Ethics:** Please also note that the 'University of Waterloo requires all research conducted by its students, staff, and faculty which involves humans as participants to undergo prior ethics review and clearance through the Director, Office of Human Research and Animal Care (Office). The ethics review and clearance processes are intended to ensure that projects comply with the Office's Guidelines for Research with Human Participants (Guidelines) as well as those of provincial and federal agencies, and that the safety, rights and welfare of participants are adequately protected. The Guidelines inform researchers about ethical issues and procedures which are of concern when conducting research with humans (e.g. confidentiality, risks and benefits, informed consent process, etc.).

If the development of your research proposal consists of research that involves humans as participants, the please contact the course instructor for guidance and see: [www.research.uwaterloo.ca/ethics/human/](http://www.research.uwaterloo.ca/ethics/human/)