CIVE 510 – INDUSTRIAL METABOLISM & GLOBAL ENVIRONMENTAL CHANGE

Term – Fall 2017 (201709)

Instructor | Office Hours
---|---
Dr. Chris Kennedy | By appointment
Phone: | E-mail: cakenned@uvic.ca

List all prerequisites and co-requisites:

LECTURE DATE(S)

| Days: Thursday | Time: 1-3 pm | Location: ECS 304b |

Reference Materials:
See course reading list at end.

COURSE OBJECTIVES:

This course explores the environmental impacts of industrial society in broad global terms, using study of energy and material flows to understand how engineering activities stress planetary boundaries. The impacts of population growth and technology on biodiversity loss, climate change and water stresses are first examined. The challenge of feeding a growing population while avoiding massive species extinction and loss of ecosystem services is discussed. The study of industrial metabolism and the method of material flow analysis are then used to link civil engineered products or systems (e.g., infrastructure, energy systems, water, materials, buildings, structures) to global environmental change. The course wraps up with discussion of resource decoupling and elective extended topics of critical metals, water-energy nexus, megacities and the circular economy.

LEARNING OUTCOMES: At the end of this course, students will be able to:

1. Read scientific literature in the topic area of industrial metabolism and communicate their level of comprehension orally and in written form.
2. Describe in quantitative and qualitative terms how energy and material flows associated with population growth, economic growth and technology translate into global environmental stresses.
3. Research the connections between civil engineered products or systems (e.g., infrastructure, energy systems, water, materials, buildings, structures) and global environmental change.
4. Write a term paper to a format and standard of a conference proceeding.
Weight & Date(s) of Assessments: | Weight | Date |
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Key Reading Reports: | 40% | weekly |
Presentation on extended topic | 10% | Last 2 classes |
Paper | 50% | End of term |

**Key Reading Reports**

At the start of class each week, submit a 1 page report on the key reading (marked by *) and be prepared to discuss it (and the other readings). The report should provide your reflections on the key reading as follows; describe:

- 3 central concepts/issues of the paper, with justification
- 2 things you don’t understand, and why you don’t understand them
- 1 question you would like to ask the author, that goes beyond the article

**COURSE LECTURE NOTES**

Unless otherwise noted, all course materials supplied to students in this course have been prepared by the instructor and are intended for use in this course only. These materials are NOT to be re-circulated digitally, whether by email or by uploading or copying to websites, or to others not enrolled in this course. Violation of this policy may in some cases constitute a breach of academic integrity as defined in the UVic Calendar.

**GENERAL INFORMATION**

*Note to Students:*

Students who have issues with the conduct of the course should discuss them with the instructor first. If these discussions do not resolve the issue, then students should feel free to contact the Chair of the Department by email or the Chair’s Secretary to set up an appointment.

*“Attendance”*

Students are expected to attend all classes in which they are enrolled. An academic unit may require a student to withdraw from a course if the student is registered in another course that occurs at the same time.

An instructor may refuse a student admission to a lecture, laboratory, online course discussion or learning activity, tutorial or other learning activity set out in the course outline because of lateness, misconduct, inattention or failure to meet the responsibilities of the course set out in the course outline. Students who neglect their academic work may be assigned a final grade of N or debarred from final examinations.

Students who do not attend classes must not assume that they have been dropped from a course by an academic unit or an instructor. Courses that are not formally dropped will be given a failing grade, students may be required to withdraw and will be required to pay the tuition fee for the course.” UVic Calendar, (2017) [http://web.uvic.ca/calendar2017-09/undergrad/info/regulations/attendance.html](http://web.uvic.ca/calendar2017-09/undergrad/info/regulations/attendance.html)

**ACCOMMODATION OF RELIGIOUS OBSERVANCE**

The University recognizes its obligation to make reasonable accommodation for students whose observance of holy days might conflict with the academic requirements of a course or program. Students are permitted to absent themselves from classes, seminars or workshops for the purposes of religious or spiritual observance. In the case of compulsory classes or course events, students will normally be required to provide reasonable notice to their instructors of their intended absence from the class or event for reasons of religious or spiritual observance. In consultation with the student, the instructor will determine an appropriate means of accommodation. The instructor may choose to reschedule classes or provide individual assistance. Where a student’s participation in a class event is subject to grading, every reasonable effort will be made to allow the student to make up for the missed class through alternative assignments or in subsequent classes. Students who require a rescheduled examination must give reasonable notice to their instructors. If a final exam cannot be rescheduled within the regular exam period, students may request an academic concession.

To avoid scheduling conflicts, instructors are encouraged to consider the timing of holy days when scheduling class events. For further information, including a list of days of religious observances, please contact the Equity and Human Rights Office or visit their website: [web.uvic.ca/eqhr](http://web.uvic.ca/eqhr).

Discrimination and Harassment Policy (GV0205) [http://web.uvic.ca/calendar2017-09/general/policies.html](http://web.uvic.ca/calendar2017-09/general/policies.html)

Updated March 2017
Faculty of Engineering, University of Victoria
Standards for Professional Behaviour

“It is the responsibility of all members of the Faculty of Engineering, students, staff and faculty, to adhere to and promote standards of professional behaviour that support an effective learning environment that prepares graduates for careers as professionals....”

You are advised to read the Faculty of Engineering document Standards for Professional Behaviour which contains important information regarding conduct in courses, labs, and in the general use of facilities.
http://www.uvic.ca/engineering/current/undergrad/index.php
#section0-23

Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the University and the Department. You should consult the Undergraduate Calendar for the UVic policy on academic integrity.

Policy on Academic Integrity
http://web.uvic.ca/calendar2017-09/undergrad/info/regulations/academic-integrity.html

Equality

This course aims to provide equal opportunities and access for all students to enjoy the benefits and privileges of the class and its curriculum and to meet the syllabus requirements. Reasonable and appropriate accommodation will be made available to students with documented disabilities (physical, mental, learning) in order to give them the opportunity to successfully meet the essential requirements of the course. The accommodation will not alter academic standards or learning outcomes, although the student may be allowed to demonstrate knowledge and skills in a different way. It is not necessary for you to reveal your disability and/or confidential medical information to the course instructor. If you believe that you may require accommodation, the course instructor can provide you with information about confidential resources on campus that can assist you in arranging for appropriate accommodation. Alternatively, you may want to contact the Resource Centre for Students with a Disability located in the Campus Services Building.

The University of Victoria is committed to promoting, providing, and protecting a positive, and supportive and safe learning and working environment for all its members.”
Course Schedule & Readings

Week 1: Planetary Boundaries


Week 2: Population & Technology


Week 3: Biodiversity


Week 4: Energy & Climate Change


IPPC, AR5 WG3, Chapter 7 Energy Systems 7.11.3

Week 5: Water


Week 6: Industrial Metabolism


Week 7: Infrastructure


Week 8: Materials & Construction


**Week 9: Buildings**


**Week 10: Resource Decoupling**


**Weeks 11 & 12: Extended Topics**


