

---

**CIVE 515 – Methods, Tools, and Data for Industrial Ecology****Term – Fall 2020 (202009)**

We acknowledge with respect the Lekwungen peoples on whose traditional territory the university stands and the Songhees, Esquimalt and WSÁNEĆ peoples whose historical relationships with the land continue to this day.

**Instructor name – Prof. Kristian Dubrawski**

Phone: 250-472-5758

E-mail: [kdubrawski@uvic.ca](mailto:kdubrawski@uvic.ca)

Office: ECS 466

**Office Hours – By appointment**

Lecture Dates: Wednesdays

Time: 9:00-10:50am PST

Location: Zoom (link sent to enrolled students)

**List all prerequisites and co-requisites: None****Course Objectives**

This course covers fundamental methodologies in Industrial Ecology, for example: material flow analysis (MFA), life-cycle assessment (LCA), and input-output analysis (IOA). Topics include: environmental impacts (water, air, soil, land use change, biodiversity, safe operating boundaries for humanity) material and energy flow analysis, economy-wide material flow accounting, dynamic material flow and stock analysis, socio-economic metabolism, life-cycle inventory analysis, life-cycle impact assessment, life-cycle management, environmental footprints, environmentally extended input-output analysis. Aspects of systems thinking for sustainability challenges will be woven through all topics covered in the course. This course builds on and complements other courses such as CIVE210 (Sustainability in Civil Engineering), CIVE310 (Environmental Engineering) and CIVE315 (Environmental Policy).

Dr. Dubrawski is a Canada Research Chair at UVic, with interdisciplinary water and energy research and industry experience. He was previously a researcher at Stanford Civil & Environmental Engineering and Woods Institute for the Environment, an Associate at Harvard Kennedy School Sustainability Science, and a consultant with McKinsey & Company's Sustainability and Resource Productivity Practice.

**Learning Outcomes**

At the end of this course, you will be able to: Discuss and critique the complexity of resource use problems and environmental impacts in industrial systems; Identify and quantify critical material flows in a defined system; Review the procedures and interpret the results of life-cycle assessment; discuss and critique the implications of environmental footprints assessed by input-output models; Search and review scientific literature and evaluate the quality of information; use nature and ecological thinking in solving sustainability challenges; Constructively develop individual and group sustainability leadership skills.

## Syllabus

Topic (Tentative)	Assigned coursework
Week 1: Introduction	
Week 2: Data acquisition, management, and visualization	Quiz I
Week 3: MFA I: Substance flow analysis	Assignment I
Week 4: MFA II: Economy-wide material flow accounting	Project Part I
Week 5: MFA III: Dynamic material flow analysis	Quiz II
Week 6: LCA I: Life-cycle inventory analysis	Assignment II
Week 7: LCA II: Life-cycle impact assessment	
Week 8: LCA III: Life-cycle sustainability assessment	Project Part II
Week 9: LCA IV: Life-cycle management	Quiz III, Assignment III
Week 10: IOA/Project Week	
Week 11: IOA: Environmentally extended input-output analysis	Assignment IV
Week 12: Project Presentations and Guest/Special Seminar	

## Required Text

Title: Taking Stock of Industrial Ecology (Free eBook)

Author: Clift, Roland, Druckman, Angela (Eds.)

Publisher: Springer

Year: 2016

Other reference material to be distributed as needed.

## Assessment

Quizzes/Participation	12 %
Assignments (4 x 7% each)	28 %
Final Project (Part I)	10 %
Final Project (Part II)	20 %
Final Project (Part III)	30 %

## Course Withdrawal Deadlines:

- September 22: Withdrawal with 100% reduction of tuition fees

- October 13: Withdrawal with 50% reduction of tuition fees
- October 31: Last day for withdrawal (no fees returned)

The final grade obtained from the above marking scheme for the purpose of GPA calculation will be based on the percentage-to-grade point conversion table as listed in the current Graduate Calendar.

**There will be no supplemental examination for this course.**

**Grading:** Please see the Grading information in the current calendar at:

<https://www.uvic.ca/calendar/future/undergrad/index.php#/policies>

#### Course policies and guidelines

**Late Assignments:** *No late assignments will be accepted unless prior arrangements have been made with the instructor at least 48 hours before the assignment due date.*

**Coursework Mark Appeals:** *All marks must be appealed within 7 days of the mark being posted.*

**Attendance:** We expect students attend all lectures and labs. It is entirely the students' responsibility to recover any information or announcements presented in lectures from which they were absent.

**Electronic devices in labs and lectures:** No unauthorized *audio* or *video* recording of lectures is permitted.

**Electronic devices in midterms and exams:** Calculators are only permitted for examinations and tests if explicitly authorized and the type of calculator permitted may be restricted. No other electronic devices (e.g. cell phones, pagers, PDA, etc.) may be used during examinations or tests *unless explicitly authorized*.

**Plagiarism:** Submitted work may be checked using plagiarism detection software. Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the University and the Department. You should consult the link given below for the UVic policy on academic integrity. Note that the university policy includes the statement that "A largely or fully plagiarized assignment should result in a grade of F for the course."

**Academic Integrity:** You must make yourself aware of the University of Victoria guidelines and policy concerning fraud and academic integrity at this link, <https://www.uvic.ca/current-students/home/academics/academic-integrity/index.php>

**Policy on Academic Integrity:** <https://www.uvic.ca/calendar/future/undergrad/index.php#/policies>

**Standards of Professional Behaviour:** You are advised to read the Faculty of Engineering Document Standards for Professional Behaviour in current Undergraduate Calendar, which contains important information regarding conduct in courses, labs, and in the general use of facilities. Please find the document at this link: <https://www.uvic.ca/engineering/assets/docs/professional-behaviour.pdf>

#### Notes 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.

**University of Victoria Privacy Policy:** If any student has concerns about their private information being stored or accessed outside of Canada, they are required to inform the course instructor about their concerns before the end of second week of classes.

**Accommodation of Religious Observance:** See entry in current Undergraduate Calendar.

**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 Centre for Accessible Learning located in the Campus Services Building, <https://www.uvic.ca/services/cal/>.

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.

**Sexualized Violence Prevention and Response at UVic:** UVic takes sexualized violence seriously, and has raised the bar for what is considered acceptable behaviour. We encourage students to learn more about how the university defines sexualized violence and its overall approach by visiting [www.uvic.ca/svp](http://www.uvic.ca/svp). If you or someone you know has been impacted by sexualized violence and needs information, advice, and/or support please contact the sexualized violence resource office in Equity and Human Rights (EQHR). Whether or not you have been directly impacted, if you want to take part in the important prevention work taking place on campus, you can also reach out:

**Where:** Sexualized violence resource office in EQHR; Sedgewick C119  
**Phone:** 250.721.8021  
**Email:** [svpcoordinator@uvic.ca](mailto:svpcoordinator@uvic.ca)  
**Web:** [www.uvic.ca/svp](http://www.uvic.ca/svp)

**Policy on Inclusivity and Diversity:** See the entry in the current Undergraduate Calendar.

### 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.

### Syllabus statement

A note to remind you to take care of yourself. Do your best to maintain a healthy lifestyle this semester by eating well, exercising, getting enough sleep and taking some time to relax. This will help you achieve your goals and cope with stress. All of us benefit from support during times of struggle. You are not alone.

**Counselling Services** - *Counselling Services can help you make the most of your university experience. They offer free professional, confidential, inclusive support to currently registered UVic students.*

<https://www.uvic.ca/services/counselling/>

**Health Services** - *University Health Services (UHS) provides a full service primary health clinic for students, and coordinates healthy student and campus initiatives.* <http://www.uvic.ca/services/health/>

**Centre for Accessible Learning** - *The CAL staff are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations* <https://www.uvic.ca/services/cal/>. *The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.*

**Elders' Voices** - *The Office of Indigenous Academic and Community Engagement (IACE) has the privilege of assembling a group of Elders from local communities to guide students, staff, faculty and administration in Indigenous ways of knowing and being.*

<https://www.uvic.ca/services/indigenous/students/programming/elders/index.php>

The [Office of the Ombudsperson](#) is an independent and impartial resource to assist with the fair resolution of student issues. A confidential consultation can help you understand your rights and responsibilities. The Ombudsperson can also clarify information, help navigate procedures, assist with problem-solving, facilitate communication, provide feedback on an appeal, investigate and make recommendations.  
Phone: 250-721-8357; Email: [ombuddy@uvic.ca](mailto:ombuddy@uvic.ca); Web: [uvicombudsperson.ca](http://uvicombudsperson.ca).