Circular Economy

Titulaires
Wouter ACHTEN (Coordonnateur) et Prakash VENKATESAN

Mnémonique du cours
ENVI-F438

Crédits ECTS
5 crédits

Langue(s) d'enseignement
Anglais

Période du cours
Deuxième quadrimestre

Campus
Solbosch

Contenu du cours

This course consists of two parts, given by two teachers. M. Venkatesan and M. Achten

For Mr. Venkatesan's part.

Module 1 (PV) consists of 2 sections. Part A deals with the overreaching problems associated with the linear economy (planetary boundaries, footprints...) and Part B contains broad introduction to various definitions/schools of thoughts that contributed to the formation of CE

Module 2 (PV) is about 2 important parts of the inner loops of C.E - Repair and Remanufacturing. In repair there will be a focus on Disassembly map Method. Remanufacturing will focus on Prof. Gutowski's energy analysis and case studies. Additionally there will be lectures on ecodesign and product obsolescence.

In Module 3 (PV), a detailed look into the recycling part of the butterfly diagram will be presented. It will delve into the issues of – limiting factors of recycling, product centric vs material centric recycling, metal wheel, IPAT equation with examples from metal, WEEE and a product centric approach for Lithium batteries

Module 4 belongs to Prof. Achten and is described below

Module 5: Legislation and policies relevant to CE. Historical aspects of recycling policy to the current CE package.

Module 6: Criticisms on CE from various dimensions. Thermodynamic, rebound effects, growth vs green growth vs degrowth, neoclassical economics vs ecological economics, a case study on Swedish CBM

M. Achten will focus on how to evaluate circular economy (activities).

In a first place the basic reasoning of the necessity to evaluate the potential environmental impacts (and/or benefits) of circular economies will be explained, as well as the methodological challenges that that necessity entails. In a second step we'll have a glance at the current evaluation initiatives that exist and to which critics they are prone. Based on that we will revisit some of the methods seen in the Q1 course on Impact Assessment and Management, and see how some of these methods could potentially help in evaluating circular economy activities, and which methodological advancements that would entail. In that context we will deepen the knowledge on life cycle assessment and input-output analysis.

This part of the cours will also pay attention to the biological cycles as describes in the butterfly model of the Ellen McArther Foundation, mainly by talking about the carbon neutrality debate ongoing in the carbon-accounting and carbon-assessment context.

In this course we also organise excursions (specific communication on these will follow when the cours has started) which give you the opportunity to visit several different types of organisation which are undertaking different types of circular economy activities.

Objectifs (et/ou acquis d'apprentissages spécifiques)

The teaching unit aims to present the notion of circular economy in general, to analyze industrial sectors in terms of their environmental impact, to study the processes put in place to improve circularity (recycling, reuse , repair, energy recovery, etc.) and to set up assessment tools.

In the part of M Venkatesan the learning objectives are

- to understand (in a quantified manner) the major challenges of linear economy
- to get insight into broad schools of thoughts that inform C.E
- to gain knowledge about and the differences between different schools of C.E - repair, remanufacturing and recycling
- to get a brief idea about ecodesign and how to tackle product obsolescence
- to gain knowledge into the evolution of various policies and legislations informing C.E
- to gain insight into various criticisms that are levied on C.E

In the part on environmental assessment (Part of M. Achten) the objectives are:

- get insight in the assessment challenges of circular economy activities, and the potential solutions to be found in adapting known assessment methods

- gain knowledge on consequential LCA

- gain knowledge on Input-Ouput models specifically developed for circular economy actions/solution

- gain knowledge on how to treat timing of GHG emission in assessment of bio-based circular solutions

Pré-requis et co-requis

Connaissances et compétences pré-requises

For the part of M. Venkatesan and M. Achten the cours on Environmental Impact Assessment and Management gives the necessary knowledge to enter this cours on circular economy.

Méthodes d'enseignement et activités d'apprentissages

Part I (Venkatesan): This part consists of classes regularly on Tuesdays 18.00-21.00 PM on campus. There is also the possiblity to provide the material via online packages and for some of the topics external speakers are invited to transfer their expertise.

Partie II (Achten) : This part consists of 3-4 on campus teaching sessions, where there is place for interactivity. There is also the possiblity to provide the material via online packages and to come to class only for discussions, Q&R, etc. For some of the topics external speakers are invited to transfer their expertise.

Contribution au profil d'enseignement

Understand and improve the environmental balance of production processes and, in particular, improve their circularity at different scales (material, product, system).

Références, bibliographie et lectures recommandées

M. Venkatesan will post both the lectures as well as reading materials supporting the lecture directly to UV

For his part, M. Achten will provide reading material along the teaching material following the rythm of the teaching sessions.

Support(s) de cours

Université virtuelle

Autres renseignements

Lieu(x) d'enseignement

Solbosch

Contact(s)

Wouter Achten

Prakash Venkatesan

Méthode(s) d'évaluation

Examen écrit

Méthode(s) d'évaluation (complément)

Partie I: written exam which may include a part on multiple choice questions and a part on excursions.

Partie II : Open and closed question (2 questions)

Construction de la note (en ce compris, la pondération des notes partielles)

Prorated to the number of hours: parts I: 68%; Part II: 32%.

Langue(s) d'évaluation principale(s)

Anglais

Programmes

Programmes proposant ce cours à la faculté des Sciences

MA-ENVI | Master en sciences et gestion de l'environnement | finalité Gestion de l'environnement/bloc 1 et MA-GEOG | Master en sciences géographiques, orientation générale | finalité Urban studies/bloc 1 et finalité Urban studies/bloc 2