



Center For International Programs & Sustainability Studies

Course: Introduction to The Circular Economy

Course Code: ECON 3500

Total Contact Hours: 48 Hours

Pre-requisites: None

COURSE DESCRIPTION

We are currently on an unsustainable economic path. Our Earth is at risk of failing to provide the life support systems that we, as humans, need to live on this planet (clean air, water, food, among others). An increasing population with more financial means is putting enormous pressure on natural resources. More money means more consumption, more production, and ever-increasing use of natural resources.

We are currently consuming 1,75 times the Earth's carrying capacity, meaning that we are using 75% more natural resources than we are generating every year (Lacy et al., 2020). The consequences of our current (unsustainable) systems of consumption and production are staggering. Since the offset of the industrial revolution and our capitalist societies, we have lost an average of 68% of mammals, birds, fish and reptiles, and plants (WWF, 2020). The Latin American and Caribbean region has experienced the most significant loss: 95% of their biodiversity since 1970. The current emissions patterns are also increasing the average temperatures of our planet. By 2030, temperatures will likely increase 1,5 degrees if we continue in the same path. The economic losses of a 1,5-degree temperature rise are estimated at 58 trillion US in 2100 (IPCC, 2018). Is business, as usual, even an option?

We need to substantially rethink our current production systems and consumption based on a linear process of "take-make-waste." Instead, we need to look for business, societal, and economic models that use fewer resources and products that live longer lives and can be re-used at the end of their functional life. This is what the circular economy is about.

In this course, students will learn the principles of the circular economy and its practical application in the analysis of different industries and products used in our daily life: small electronics, textiles, or food. The course will combine lectures with practical exercises in which the students will discuss how different products could be designed from the start using a circular perspective; what new business opportunities emerge; what are the main challenges for a transition to a circular economy, and what policymakers and regulators can do to ease the transition to a circular economy.

AUDIENCE

This course is structured for international students attending the Study Abroad Program at an LCI Education university campus. However, courses are not exclusive to foreigners so local degree-seeking students may enroll in this course. Some of the courses are also taught in Spanish as part of our Bachelor's in Sustainability Management or Business Administration programs.

This is a theoretical-practical course and explores/responds to the following inquiry according to the professional/disciplinary profile:

What are the key principles of the circular economy, and how they can be applied to products, business, industries, and cities?

To answer this question, the following generative topics will be studied:

- Growth, sustainability, and the circular economy

- Circular economy principles
- System thinking in the circular economy
- Business value and business models in a circular economy
- The role of innovation in the circular economy
- Circularity in different industries
- Circular cities and communities
- Policies for the circular economy
- Limitations, challenges, and opportunities of the circular economy

The course will promote the following skills:

- Ability to identify the basic principles of circularity and the differences with the linear model of production and consumption
- Ability to describe the different models used to represent circularity, specifically the butterfly diagram and the UNEP circular economy model.
- Ability to illustrate the different circularity loops with real-life examples
- Ability to apply the concepts learnt in the course to the analysis of circularity in particular products, industries or cities
- Ability to discuss the role of innovation and policies enabling the transition to a circular economy

Some of the values and attitudes fostered among students are the following:

- Systemic thinking
- Interest in learning to learn
- Connect well with others
- Work in teams
- Interest in solving problems
- Logical and communicative intelligence

COMPETENCIES, CRITERIA AND EVIDENCE

At Veritas University competencies are reflexive and integrated actions that respond to the professional profile and to context issues ideally and ethically through the integration of abilities, skills, and knowledge. What follows are the discipline and core competencies and their correspondent key competencies and evidence of learning for this course. What follows are the discipline and core competencies and their correspondent key competencies and evidence of learning for this course.

Competencies		Key competences	Learning Assessments
Discipline	Integrates knowledge and information to understand the principles of a circular economy	Understands the concept and principles of a circular economy Understands the models that are predominantly used to study the circular economy	Discussion in class Quizzes Paper 1
	Integrates knowledge and information to understand how to apply circularity principles to real cases and different contexts	Shows ability to apply the concepts learnt in the course to the analysis of particular products, business models, industries and cities Describes how policies and innovation can enable the transformation to the circular economy	Group assignments Discussions in class Paper 2

General	Communicates thoughts of the discipline orally, graphically, and in written form.	Communicates thoughts of the discipline orally, graphically, and in written form.	Presentation in group assignments Discussions in class/online Papers
	Integrates knowledge, skills and attitudes to learn continuously and through one's life pursuing an efficient development in the knowledge-based society.	Learns to learn	Participation in discussions Self-evaluations Paper analysis
	Integrates the necessary knowledge, skills, and attitudes to learn teamwork and leadership techniques.	Teamwork and leadership	Class work and assignments Participation in discussions Group work

COURSE CONTENT

1. Circular economy and sustainable development
 - 1.1. The concept of Sustainable Development
 - 1.2. Strong and weak sustainability

- 1.3. Current grand challenges
- 1.4. Agenda 2030 and SDG12. Responsible consumption and production
- 1.5. Circular economy for sustainable development

- 2. Circular economy principles: circular by design
 - 2.1. From a linear to a circular economy
 - 2.2. Circular economy principles
 - 2.3. System thinking and circularity
 - 2.3. The Butterfly diagram
 - 2.4. The UNEP user-centric circularity circular model

- 3. Business models in a circular economy
 - 3.1. Business opportunities in a circular economy
 - 3.2. Principles of circular business models
 - 3.3. Circular products
 - 3.4. Circular supply chains
 - 3.5. Measurement tools

- 4. The role of innovation in the circular economy
 - 4.1. Typologies of innovations
 - 4.2. New products
 - 4.3. New processes
 - 4.4. New services
 - 4.5. New materials
 - 4.6. New technologies

- 5. The role of policies for the circular economy
 - 5.1. Regulation
 - 5.2. Funding & taxation

5.3. Public investment

5.4. Public procurement

5.5. Research & Education

5.6. Collaboration

6. Deeper look: Food systems (Regenerative agriculture, food waste)

6.1. Industry challenges

6.2. Circular opportunities

6.3. Enabling conditions

6.4. Examples

7. Deeper look: Textiles and apparel

7.1. Industry challenges

7.2. Circular opportunities

7.3. Enabling conditions

7.4. Examples

8. Deeper look: Small electronics and other consumer goods

8.1. Industry challenges

8.2. Circular opportunities

8.3. Enabling conditions

8.4. Example

9. Deeper look: Plastics and other chemicals

9.1. Industry challenges

9.2. Circular opportunities

9.3. Enabling conditions

9.4. Example

10. Circular cities and neighborhoods

10.1. The concept of city metabolism

10.2. Energy

10.3. Mobility

10.4. Building

10.5. Food

11. Circular and sustainable lifestyles

11.1. The consumer society

11.2. Sustainable lifestyles

11.3. Determinants of lifestyles

11.4. The role of the individual vs the context

11.5. Becoming a changemaker

12. So what? Limitations, challenges, and opportunities for the future

12.1. A recap of what we learnt

12.2. Limitations of the circular economy

12.3. Opportunities of the circular economy

METHODOLOGY

This course implements active methodology, in which the student is subject of its own learning at all stages. Within this methodology both inductive and deductive methods are applied as well as various techniques in an eclectic way. The analysis of scientific articles provides an updated perspective of the advances and applications of the scholarly work on circular economy, and encourages group participation, discussion, and analysis.

The Project Based Learning (PBL) "seeks to confront students to situations that lead them to rescue, understand and apply what they learn as a tool to solve problems or propose improvements in the communities where they develop" (translated from Fundación

Educación para el Desarrollo - Fautapo, 2009, pp. 27-29). The applications represent real situations and problems, the activities allow the search of information and the construction of own knowledge, favouring knowledge retention and transfer. The conditions under which the projects are addressed enable the student to develop collaborative skills rather than competence, and enhance skills in productive work, autonomous learning, and continuous improvement.

Along the course the expository method is used both by the professor and by students, individually and in groups, always promoting the participation of the students through their direct intervention in discussions, extension of concepts and analysis of the topics exposed. Since research is a pillar of the subject, the subjects to be discussed and exhibited in class and in the different assignments are firstly investigated at a bibliographic level by the students as a prerequisite to present group and individual work products.

The scientific method is applied in all assignments.

The role of the professor is to mediate, facilitate and guide the teaching and learning process, allowing students to build and self-regulate learning, based on their previous and significant knowledge and interests; the student is active, the teaching-learning process is collective and socialized, as it fosters social integration, the development of group work skills, community feeling and respect, without neglecting individualization.

EDUCATIONAL RESOURCES

In order to guarantee good development of the course, therefore, to guarantee learning, the following resources are available: an updated bibliographic database, multimedia equipment that students can use for their individual presentations, whiteboards and other school equipment for weekly sessions, and readings provided by the educator. All of these complement the suggested projects and provide the students with higher possibilities of knowledge on their own ship. The lessons will take place in the classroom. During independent work periods students will be able to attend the institution. A campus library, study rooms, and

computer labs are available for the students' independent work time. Free Wi-Fi connection for students, educators, and staff is provided on campus, which gives students the possibility to work not only in the library or computer labs, but also around campus.

LEARNING ASSESSMENT

In order to make the course or program better competencies-based evaluation compiles and evaluates evidence by taking into account feedback providing pre-established criteria. The course evaluation must be aligned with the competencies and the teaching methodology. There is a rubric for each evaluation resource, and the details will be provided in **CANVAS LMS**. Even though the rubric grants a grade, it is also a quantitative and qualitative description of the students' performance. The rubrics include the core and discipline key competences.

Learning activity	Percentage value
1. Analysis of a scientific article	10
2. Individual project and presentation	40
3. Group research project and presentation	40
4. Individual reflection on sustainable lifestyles and presentation	10
Total	100%

LEARNING STRATEGIES

The following learning strategies will be developed:

1. Analysis of a scientific article:

The analysis of scientific articles provides an updated perspective of scientific and technological progress and applications and encourages group participation and discussion as well as individual learning. Each student searches and chooses a scientific article or report from the suggested course reading list, reads it, analyses it, deepens the search if necessary and presents a summary of it to the class, bringing a generating question to encourage group

discussion. The subject is free but must be closely related to the course topics. One article analysis per student is required; a formal presentation is not required. Presenting time plus questions and discussion will be 10 minutes maximum. The original article or report must be sent to the professor for approval before presentation deadline. The professor will encourage that each student chooses a different article, so as to enrichen the discussion. The analysis of the scientific article represents 10% of the total grade.

Each student chooses an article, reads it, extends the comprehension of the article's topic through bibliographical research if necessary, and summarizes it to present it to the class, including a question to generate an interesting discussion. Presenting time plus questions and discussion will be 10 minutes maximum. The original article must be sent to the professor for approval one week before presentation deadline at the latest, including the generating question.

2. Individual project:

At the beginning of the course, each student chooses a **product** used in his/her everyday life, investigates its circularity principles and discusses possible ways in which it could be made more circular using one of the two models discussed in the course (the butterfly diagram or the UNEP user-center diagram). Based on the bibliographical research, a proposal on how to make it more circular must be elaborated. The result of the project is evaluated in the form of a presentation describing the circular principles of the product and how it could be made more circular according to the butterfly or UNEP models, and a presentation. The models will be introduced by the teacher in class. The project is developed along the course, the professor guides the process and assesses the results, self-evaluation and co-evaluation are also performed. Students are encouraged to choose easily accessible product. Presenting time plus questions and discussion will be 20 minutes maximum, depending of the amount of students enrolled. The individual project represents 40% of total grade.

Each student chooses a **product** used in his/her everyday life, investigates its circularity principles and discusses possible ways in which it could be made more circular using one of

the two models discussed in the course (the butterfly diagram or the UNEP user-centred diagram). Based on the bibliographical research, a proposal on how to make it more circular must be elaborated. Presenting time plus questions and discussion will be 20 minutes maximum. The description of the chosen product must be sent to the professor at the end of week 3, the latest.

3. Group project:

Group work allows developing important attitudes, values, and skills, such as tolerance, respect, solidarity, leadership, teamwork, and communication, as well as knowledge integration and equity. The assignment consists of research on a given industry of the group choice and includes a presentation using PPT, or another useful tool. The research made by the group should:

- a) Identify the circular opportunities in that industry
- b) Identify at least one company that is applying circular economy principles in that industry. Alternatively, identify a business opportunity to make that industry more circular.
- c) Analyse the foreseen challenges to increase the circularity of the industry by looking at the value chain of the analysed business, the technological constrains and the role of the consumer
- d) Discuss how policies could help addressing the observed constrains, possibly with an example of how it has been done somewhere around the world.

Each group member must participate actively during research and presentation, the idea is to do it as a group so splitting the topic into sections for each participant is not recommend. Members of the class not presenting act as a public and together with the professor ask questions to the presenters about the topic. These questions will be asked randomly. Presenting time plus questions and discussion will be 20 minutes maximum, depending on the number of students enrolled; the assignment is 40% of total grade.

Each student will be assigned to a group. And each group will choose a focus industry. The research made by the group should: a) Identify the circular opportunities in that industry b)

Identify at least one company that is applying circular economy principles in that industry. Alternatively, identify a business opportunity to make that industry more circular. c) Analyse the foreseen challenges to increase the circularity of the industry by looking at the value chain of the analysed business, the technological constrains and the role of the consumer d) Discuss how policies could help addressing the observed constrains, possibly with an example of how it has been done somewhere around the world. The group should inform the professor their industry of choice at the end of week 3 the latest. The presentation should not last more than 20 minutes.

4. Individual reflection on sustainable lifestyles and presentation: the individual presentations are meant to develop specific skills and abilities in the student, such as research skills, self-confidence, time management, and responsibility. At the same time, students can choose a topic of their interest, and present it the way they want, which makes the learning experience significant. Each student prepares a presentation through the course using PPT, or another useful presentation tool, even posters are allowed. The content of the presentation is focused on personal choices as a consumer and how they could be made more sustainable. The student reflects on the role of personal motivations and context, societal and economic context, infrastructure, and accessibility in his/her consumer choices in a particular realm (food, transport, leisure) and proposes three actions that can be taken individually to make its lifestyle more sustainable. Students use extra class time to research and prepare the presentation Presenting time plus questions and discussion will be 10 minutes maximum depending on the number of students enrolled. Co-evaluation and self- assessment will be applied to this assignment which represents 10% of total grade.

For All Presentations

These aspects will always be considered for presentations:

- Preparation and content: topic relevance, knowledge assimilation, answers to

- classmates' and professor questions, and content deepness due to evident
- research.
- Organization and style: smoothness, independence from notes and devices,
- speaking clarity, slides clarity and aesthetics, text, and images balance.
- Time limit respect: each presentation has a time limit, students will be informed
- about this in advance.
- Personal opinion: robust opinion reflecting serious analysis of the topic and
- previous research.
- Punctuality: presentations must be presented on the assigned date, not following
- this rule means a grade of 0% on that presentation unless the absence or
- lack of assignment is properly justified.

Each student is asked to reflect on his/her sustainable lifestyles, including the role of personal motivations and context, societal and economic context, infrastructure and accessibility in his/her consumer choices in a particular realm (food, transport, leisure). Each student proposes three actions that can be taken individually to make its personal lifestyle more sustainable and prepares a presentation through the course using PPT, or another useful presentation tool, even posters are allowed. The content of the presentation is focused on personal choices as a consumer, how they could be made more sustainable and the constraints to do so. The presentations should not last more than 10 minutes.

All assignments will refer to all material reviewed in class and readings.

ATTENDANCE

Regarding classes:

1. Students are only allowed a two (2) **non-consecutive (back-to-back) class absences**. A student shall fail the course if more than two absences are registered by the professor. Administration does not control attendance.
2. Three **late arrivals** to class (arrival after the first 15 minutes) are treated as one absence. Attending class 30 minutes late without an official justification will also count as an absence.

3. In the case of an **absence from any assignment evaluated in class** (presentations, evaluations, field trips, etc.) a student will be given a grade of zero unless an official document is presented within **one week** of the absence.
4. If a student presents an official document to excuse the absence, the missed assignment is to be presented on that same day.

Regarding field trips:

5. An unjustified **absence on a field trip** will immediately result in the loss of all points assigned to that specific trip. However, if an official document justifying the absence is presented, 50% of the assignment points may be obtained upon presentation of a complementary research assignment, to be agreed upon with the professor, within one week of the field trip.
6. An absence on a field trip may be justified should two course field trips coincide. In such a case, and to avoid losing points, students shall be able to opt for carrying out a research assignment.

CODE OF CONDUCT

Professors have the right to expel a student from the classroom should he / she/ they:

1. Be disruptive in the classroom.
2. Behave in a disrespectful way.
3. Be under the influence of alcohol.
4. Be under the influence of any illegal drug.
5. Shows hygiene or odor problems that may disturb other students.

ELECTRONIC DEVICES

The use of cell phones, smartphones, or other mobile communication devices is disruptive and is therefore prohibited during class. **Please turn all devices OFF and put them away** when class begins. Devices may be used only when the professor assigns a specific activity and allows the use

of devices for internet search or recording. Those who fail to comply with the rule must leave the classroom for the remainder of the class period. Using devices while the professor or other peers are lecturing, or presenting is perceived as a lack of interest and disrespectful.

STUDY ABROAD PROGRAM POLICIES

The student must comply with the provisions of the Study Abroad Program Policies available on the Canvas/Omnivox platform.

BIBLIOGRAPHY

The main reference manual for the course is:

Lacy, P., Long, J. and Spindler, W. (2020) "The Circular Economy Handbook". Palgrave.

Additional references:

Akenji, L. et al. (2021). 1.5-Degree Lifestyles: Towards a fair consumption space for all.

Circle economy (2021) The circularity gap report - <https://www.circularity-gap.world/2021>

The Collaborating Centre on Sustainable Consumption and Production (CSCP) (2018) The Circular Economy Guidebook for Cities

Den Hollander, M.C., Bakker, C.A., Hultink, H. (2017): Product design in a circular economy; development of a typology of key concepts and terms.

Ellen MacArthur Foundation (2013) Towards the Circular Economy. Economic and business rationale for an accelerated transition

Ellen MacArthur Foundation (2015) Delivering the Circular Economy: A Toolkit for Policymakers

Ellen MacArthur Foundation (2017) Cities in the circular economy An initial exploration

Ellen MacArthur Foundation (2019) Completing the Picture How the Circular Economy tackles Climate Change

Ellen MacArthur Foundation (2019) Cities and Circular Economy for Food

International Resource Panel, UN Environment (2019) Global Resources Outlook Report 2019

Jonker, J. et al., (2018) Organising for the Circular Economy. A workbook for developing

Circular Business Models

- Kirchherr, J., & Hekkert, M.P., (2017) Conceptualizing the Circular Economy: An Analysis of 144 Definitions
- Klaver, J., (2018) Individual Sustainable Consumption and the Circular Economy: Research challenges and Opportunities
- Korhonen, J., Honkasalo, A., Seppälä, J., (2017) Circular Economy: The Concept and its Limitations
- OECD (2019) Business Models for the Circular Economy: Opportunities and Challenges for Policy
- OECD (2020) The Circular Economy in Cities and Regions
- One Planet Network (2019) Building Circularity in the Textile Value Chain
- PACE (2019) A New Circular Vision for Electronics Time for a Global Reboot
- Leach, M., Raworth, K. and Rockström, J., (2013). Between social and planetary boundaries: Navigating pathways in the safe and just space for humanity.
- Rockström, J. & Sukhdev, P., (2016) How food connects all the SDGs
- Schroeder, P., Anggraeni, K., & Weber, U., 2018: The Relevance of Circular Economy Practices to the Sustainable Development goals
- Steffen, W. et al., (2015) Planetary Boundaries: Guiding human development on a changing planet
- Tunn, V. & et al., (2018) Business Models For Sustainable Consumption In The
- UN (2015) Transforming Our World: The 2030 Agenda for Sustainable Development
- UNEP (2018) Sustainable Lifestyles. Options & Opportunities.
- UNEP, (2010) ABC of SCP. Clarifying Concepts on Sustainable Consumption and Production
- UNEP, (2018) Building Circularity into our Economies using Sustainable Procurement
- UNEP, (2021) The Role of Business in Moving from Linear to Circular Economies

CHRONOGRAM

Week	Key competences	Content (Session number and title)	Evidence of learning
1	Understands the concept and principles of a circular economy and its current limitations and	1. Circular economy and sustainable development	Professors presentation Brainstorming Individual and group project topic analysis
2	challenges Understands the models that are predominantly used to study the circular economy	2. Circular economy principles: circular by design	Professors presentation Brainstorming Individual and group project topic analysis
3		3. Business models in a circular economy	Professors' presentation Brainstorming Article presentation
4	Describes how policies and innovation can enable the transformation to the circular economy	4. Innovation and the circular economy	Professors presentation Brainstorming Group project work Article presentation

Week	Key competences	Content (Session number and title)	Evidence of learning
5		5. Policies for a circular economy	Professors' presentation Brainstorming Group project work Article presentation
6	Shows ability to apply the concepts learnt in the course to the analysis of particular products, business models, industries, cities and personal lifestyles	6. Food systems	Professors' presentation Brainstorming Group project work Article presentation Field visit
7		7. Textiles and apparel	Professors' presentation Brainstorming Group project work Article presentation
8		8. Small electronics	Professors' presentation Brainstorming

Week	Key competences	Content (Session number and title)	Evidence of learning
			Group project work Article presentation
9		9. Plastics and chemicals	Professors' presentation Brainstorming Group project work Article presentation
10		10. Cities and neighborhoods	Professors' presentation Brainstorming Group project work Article presentation
11. Lifest yles		11. Lifestyles	Professors' presentation Brainstorming Individual work
12	Understands the concept and principles of a circular economy and its current	12. So what?	Professors' presentation Individual reflection on sustainable lifestyles presentation

Week	Key competences	Content (Session number and title)	Evidence of learning
	limitations and challenges		