Course title: Circular Economy
Language of instruction: English
Professor: Lela Mélon
Professor's contact and office hours: upon agreement
Course contact hours: 45
Recommended credit: 6 ECTS credits
Course prerequisites: There are no specific prerequisites for this course, just a genuine interest in sustainability and circular economy and being briefly familiarized with the UN Agenda 2030 and the Sustainable Development Goals.

Language requirements: English level B2

Course focus and approach: The course "Introduction to Circular Economy" is designed to provide students with a comprehensive understanding of the principles, strategies, and applications of circular economy practices. The course aims to empower students with the knowledge and tools to promote sustainable and circular business behavior in various industries.

Approach Overview:

1. **Interdisciplinary Perspective:** The course adopts an interdisciplinary approach, drawing insights from economics, environmental science, engineering, business management, and social sciences. This approach allows students to understand the multifaceted nature of circular economy challenges and opportunities.

2. **Theory and Real-World Examples:** The course will combine theoretical concepts with real-world case studies, examples, and success stories of companies and organizations implementing circular economy practices. This approach will provide students with practical insights into the benefits and challenges of adopting circular economy models.

3. **Active Learning:** Active learning methods, such as group discussions, debates, and problem-solving exercises, will be employed to engage students actively in the learning process. Students will be encouraged to share their perspectives and critically analyze circular economy strategies.

4. **Guest Speakers and Industry Experts:** Inviting guest speakers and industry experts to share their experiences and insights will enhance students' understanding of circular economy implementation in various sectors. This will also expose students to current trends and challenges in the field.

5. **Project-based Learning:** Throughout the course, students will work on a group or individual project related to circular economy practices. This project will allow them to apply their knowledge and develop practical solutions to real-world circular economy challenges.

6. **Ethical and Social Considerations:** The course will address the ethical and social implications of circular economy practices, emphasizing the importance of inclusivity, social responsibility, and sustainable development.

7. **Policy and Governance:** Students will explore the role of government policies, regulations, and international frameworks in shaping circular economy adoption. They will analyze the impact of policy measures on circular economy initiatives.

8. **Assessment and Feedback:** The course assessment will be a combination of class participation, assignments, case study analysis, and a final project presentation. Regular feedback will be provided to students to support their learning journey and improvement.

By the end of the course, students will be equipped with the necessary knowledge and critical thinking skills to advocate for and drive sustainable circular practices in businesses and organizations. They will have a deep understanding of circular economy principles and be able to analyze and address real-world challenges in a sustainable and socially responsible manner.

Course description: The course "Introduction to Circular Economy" provides a comprehensive exploration of the principles, strategies, and applications of circular economy practices. Students will gain a deep understanding of the advantages of circular economy over linear models, various circular business models, and the integration of circular practices in supply chain management, waste reduction, and renewable energy. The course also addresses the role of technology, policy, and consumer behavior in promoting circular economy adoption. Through real-world case studies and interactive discussions, students will analyze challenges and opportunities in implementing circular economy initiatives, fostering a sustainable and socially responsible mindset for the future.

Learning objectives: By the end of the course, students will be able to:

- Define the concept of circular economy and differentiate it from linear economy models.
- Understand the fundamental principles and advantages of adopting circular economy practices.
- Identify and assess different strategies and business models for implementing circular economy principles.
- Analyze the impact of circular economy on supply chain management and waste reduction efforts.
- Evaluate the role of circular economy in the built environment, renewable energy, and technological advancements.
- Examine the policy and governance aspects influencing circular economy adoption.
- Discuss the ethical considerations and social implications of circular economy practices.
- Investigate consumer behavior and its role in promoting circular economy initiatives.
- Critically assess challenges and opportunities in implementing circular economy practices in different global contexts.
- Apply circular economy principles to real-world case studies and propose sustainable solutions.

These learning objectives will guide students in acquiring the knowledge and skills necessary to understand, evaluate, and promote sustainable circular practices in business and society.

Course workload: The course will develop along a full term, with twenty-one (21) two-hour sessions. Each of them will consist of a lecture by the professor, a discussion about the required readings, and in some cases additional activities addressed to specific issues of the course. Depending on the nature of such activities, active participation of students will be required. Readings for each session are compulsory as a basis for discussion, without exception. A close approximation to the Problem Based Learning method.

Teaching methodology: focus of the class will be on thorough understanding of the theoretical concepts as applied in practice through problem-based learning.

Assessment criteria:

Apart from lectures, course activities will imply course and reading assignments, as well as active participation by students. The evaluation of the course will combine continuous assessment and a final examination, according to the following criteria:

Midterm: 40%
Course assignments: 20%
Final exam: 40%

It is possible to obtain additional 10% from outstanding active in-class participation.

Retaking conditions:
For students failing the course after the final examination, it will be possible to retake the exam while grades for course assignments and class participation are maintained.

BaPIS absence policy
Attending class is mandatory and will be monitored daily by professors. Missing classes will impact on the student's final grade as follows:

Absences	Penalization
Up to two (2) absences	No penalization
Three (3) absences	1 point subtracted from final grade (on a 10-point scale)
Four (4) absences	2 points subtracted from final grade (on a 10-point scale)
Five (5) absences or more	The student receives an INCOMPLETE ("NO PRESENTADO") for the course

The BaPIS attendance policy **does not distinguish between justified or unjustified absences**. The student is deemed responsible to manage his/her absences.

Only absences for medical reasons will be considered justified absences. The student is deemed responsible to provide the necessary documentation. Other emergency situations will be analyzed on a case by case basis by the Academic Director of the BaPIS.

The Instructor, the Academic Director and the Study Abroad Office should be informed by email without any delay.

Classroom norms:
- No food or drink is permitted in class.
- Students will have a ten-minute break after one one-hour session.
- Active class participation is mandatory

Weekly schedule

Week 1: Introduction to Circular Economy

- Introduction to Circular Economy: Definition and Principles
- Advantages of Circular Economy over Linear Economy
- Historical Context and Evolution of Circular Economy Concepts

Reading and class discussion: suggested readings, the important summaries will be provided by the professor a week before each class.

1. **Ellen MacArthur Foundation (2012).** "Towards the Circular Economy: Economic and business rationale for an accelerated transition." Read Here
2. **Stahel, W. R. (2010).** "The Performance Economy." Palgrave Macmillan. Book Link
3. **Geissdoerfer, M., Savaget, P., Bocken, N. M., & Hultink, E. J. (2017).** "The Circular Economy—A new sustainability paradigm?" Journal of Cleaner Production, 143, 757-768. Read Here

4. **Ghisellini, P., Cialani, C., & Ulgiati, S. (2016).** "A review on circular economy: The expected transition to a balanced interplay of environmental and economic systems." Journal of Cleaner Production, 114, 11-32. Read Here
5. **Kirchherr, J., Reike, D., & Hekkert, M. (2017).** "Conceptualizing the circular economy: An analysis of 114 definitions." Resources, Conservation and Recycling, 127, 221-232. Read Here

These readings provide a solid foundation for understanding the concept, principles, and rationale behind the circular economy. They offer insights from various perspectives and authors, enabling students to critically analyze the transition towards a circular economy and its implications for businesses and society.

Week 2: Circular Economy Strategies

- Design for the Circular Economy: Cradle-to-Cradle Approach
- Extended Producer Responsibility (EPR) and Product Stewardship
- Remanufacturing, Refurbishment, and Repair Strategies

Reading and class discussion:

1. **Bocken, N. M., de Pauw, I., Bakker, C., & van der Grinten, B. (2016).** "Product design and business model strategies for a circular economy." Journal of Industrial and Production Engineering, 33(5), 308-320. Read Here
2. **Tukker, A. (2015).** "Product services for a resource-efficient and circular economy–a review." Journal of Cleaner Production, 97, 76-91. Read Here
3. **Ghisellini, P., Cialani, C., & Ulgiati, S. (2018).** "A review on circular economy: The expected transition to a balanced interplay of environmental and economic systems." Journal of Cleaner Production, 114, 11-32. Read Here
4. **Ghisellini, P., Cialani, C., & Ulgiati, S. (2016).** "A review on circular economy: Implications for the packaging sector." Resources, Conservation and Recycling, 104, 329-338. Read Here
5. **Bocken, N. M., Short, S. W., Rana, P., & Evans, S. (2016).** "A literature and practice review to develop sustainable business model archetypes." Journal of Cleaner Production, 65, 42-56. Read Here

These readings explore different circular economy strategies, business models, and product design approaches that support the transition towards a circular economy. They provide insights into how businesses can innovate and adopt sustainable practices, and how circular economy principles can be integrated into various industries and sectors.

Week 3: Circular Business Models

- Different Circular Business Models (e.g., Product-as-a-Service, Renting, Leasing)
- Business Model Innovation for Circular Economy Adoption
- Case Studies of Companies Implementing Circular Business Models

Reading and class discussion:

1. **Bocken, N. M., Pauw, I., & Bakker, C. (2017).** "Towards a circular economy: Business model innovation in a Swedish municipality." Journal of Cleaner Production, 154, 9-19. Read Here
2. **Charter, M., & Tischner, U. (2001).** "Sustainable Solutions: Developing Products and Services for the Future." Greenleaf Publishing. Book Link
3. **Bocken, N. M., & Short, S. W. (2016).** "Towards a sufficiency-driven business model: Experiences and opportunities." Environmental Innovation and Societal Transitions, 18, 41-61. Read Here
4. **Gaziulusoy, I. İ., Boyle, C., McDowall, R., & Cullen, J. M. (2017).** "An analysis of circular economy and its implementation in higher education institutions." Journal of Cleaner Production, 145, 96-105. Read Here
5. **Ghisellini, P., Cialani, C., & Ulgiati, S. (2016).** "A review on circular economy: The expected transition to a balanced interplay of environmental and economic systems." Journal of Cleaner Production, 114, 11-32. Read Here

These readings delve into different circular business models, sustainable solutions, and innovative approaches to integrating circular economy principles into various organizations and sectors. They provide valuable insights into how businesses can transition towards circular practices, contribute to sustainable development, and create value in a circular economy framework.

Week 4: Circular Supply Chain and Waste Management

- Circular Supply Chain Design and Optimization
- Closed-Loop Supply Chains: Challenges and Benefits
- Waste as a Resource: Recycling and Upcycling Strategies

Reading and class discussion:

1. **Tate, W. L., Ellram, L. M., & Kirchoff, J. F. (2013).** "The progress of a closed-loop supply chain orientation: A case study of remanufacturing." Journal of Cleaner Production, 39, 127-142. Read Here
2. **Lieder, M., & Rashid, A. (2016).** "Towards circular economy implementation: A comprehensive review in context of manufacturing industry." Journal of Cleaner Production, 115, 36-51. Read Here
3. **Peng, W., & Chen, H. (2016).** "Closed-loop supply chain planning with product recovery in uncertain environment." Journal of Cleaner Production, 112, 2862-2877. Read Here
4. **Hu, D., Feng, Y., & Govindan, K. (2014).** "Design of sustainable supply chains under the emission trading scheme." Transportation Research Part D: Transport and Environment, 26, 43-54. Read Here
5. **Ramanathan, U., & Gunasekaran, A. (2014).** "Supply chain collaboration: Impact of success in long-term partnerships." International Journal of Production Economics, 147, 252-259. Read Here

These readings explore the concept of circular supply chain management, remanufacturing, and waste reduction strategies. They provide valuable insights into the challenges and benefits of closed-loop supply chains, circular economy implementation, and sustainable supply chain

planning. Additionally, they address the role of collaboration and long-term partnerships in promoting circular practices within supply chains.

Week 5: Circular Economy in the Built Environment and MIDTERM

- Circular Construction and Design Principles
- Circular Buildings and Sustainable Architecture
- Circular Cities: Urban Planning for Sustainability

Reading and class discussion:

1. **Bakker, C., den Hollander, M., van Hinte, E., & Zijlstra, Y. (2014).** "Products that Last: Product Design for Circular Business Models." TU Delft Library. Book Link
2. **Geissdoerfer, M., Savaget, P., Bocken, N. M., & Hultink, E. J. (2017).** "The Circular Economy—A new sustainability paradigm?" Journal of Cleaner Production, 143, 757-768. Read Here
3. **Flynn, D., & Williams, P. (2010).** "A design approach to sustainable construction: Developing a circular economy." Structural Survey, 28(2), 116-130. Read Here
4. **van Engelen, J., & Vos, J. P. (2019).** "Circular Cities: Accelerating the transition towards circular built environments." Sustainability, 11(9), 2664. Read Here
5. **Levihn, F., Jönsson, P. E., & Gidofalvi, G. (2015).** "Circular economy in the built environment: The concept of circular urban metabolism." Journal of Cleaner Production, 98, 185-194. Read Here

These readings focus on the circular economy's application in the built environment, sustainable product design, and circular urban metabolism. They explore the concept of circular cities and how the built environment can be optimized for circularity. The readings also discuss strategies for achieving sustainable construction and design that align with circular economy principles.

Week 6: Circular Economy and Technology

- Digitalization and Internet of Things (IoT) in the Circular Economy
- Blockchain and Circular Supply Chain Transparency
- Circular Economy Applications of Artificial Intelligence (AI) and Big Data

Reading and class discussion:

1. **Rizos, V., Behrens, A., van der Gaast, W., & Hofman, E. (2016).** "The Circular Economy: Barriers and Opportunities for SMEs." Read Here
2. **Geng, Y., Fu, J., Sarkis, J., Xue, B., & Fujita, T. (2012).** "Towards a national circular economy indicator system in China: An evaluation and critical analysis." Journal of Cleaner Production, 23(1), 216-224. Read Here
3. **Cohen, B., & Winn, M. I. (2007).** "Market imperfections, opportunity and sustainable entrepreneurship." Journal of Business Venturing, 22(1), 29-49. Read Here
4. **Stahel, W. R. (2016).** "Circular Economy." Nature, 531(7595), 435-438. Read Here

5. **Bocken, N. M., Short, S. W., Rana, P., & Evans, S. (2016).** "A literature and practice review to develop sustainable business model archetypes." Journal of Cleaner Production, 65, 42-56. Read Here

These readings explore the intersection of circular economy principles with technology, innovation, and entrepreneurship. They provide insights into the role of technology in advancing circular practices, evaluating circular economy indicators, and creating sustainable business models. Additionally, the readings discuss the opportunities and challenges for small and medium-sized enterprises (SMEs) in adopting circular economy practices.

Week 7: Circular Economy Policy and Metrics

- Government Regulations and Policies to Promote Circular Economy
- Circular Economy Metrics and Key Performance Indicators (KPIs)
- Life Cycle Assessment (LCA) and Circular Economy Evaluation

Reading and class discussion:

1. **European Commission (2015).** "Closing the loop - An EU action plan for the Circular Economy." Read Here
2. **European Environment Agency (2016).** "Circular economy in Europe: Developing the knowledge base." Read Here
3. **D'Amato, D., Droste, N., Allen, B., Kettunen, M., Lähtinen, K., Korhonen, J., ... & Sala, S. (2017).** "Making the Most of Biomass: Sustainable Production of Bioenergy from Different Wood Sources in the EU." Read Here
4. **Geissdoerfer, M., Savaget, P., Bocken, N. M., & Hultink, E. J. (2017).** "The Circular Economy—A new sustainability paradigm?" Journal of Cleaner Production, 143, 757-768. Read Here
5. **Leire, C., Casado-Vara, R., Arranz, E., & Del Río, P. (2020).** "From linear to circular: Barriers and opportunities for the implementation of circular economy practices in the Spanish context." Corporate Social Responsibility and Environmental Management, 27(1), 69-82. Read Here

These readings focus on circular economy policies, action plans, and knowledge development in the context of Europe and beyond. They also cover the sustainable production of bioenergy from biomass and the challenges and opportunities for implementing circular economy practices in different contexts, including Spain. Additionally, they explore the circular economy as a new sustainability paradigm and the role of metrics in assessing circular economy performance.

Week 8: Circular Economy and Consumer Behavior

- Role of Consumer Education and Awareness in Advancing Circular Economy
- Circular Marketing and Communication Strategies
- Circular Economy and Ethical Consumerism

Reading and class discussion:

1. **Geissdoerfer, M., Morioka, S. N., de Carvalho, M. M., & Evans, S. (2018).** "Business models and supply chains for the circular economy." Journal of Cleaner Production, 190, 712-721. Read Here
2. **Biswas, W. K., & Roy, M. (2015).** "Eco-innovations through consumer behavioral change: An Indian perspective." Journal of Cleaner Production, 95, 350-361. Read Here
3. **Vermeir, I., & Verbeke, W. (2008).** "Sustainable food consumption: Exploring the consumer attitude-behavior gap." Journal of Agricultural and Environmental Ethics, 19(2), 169-194. Read Here
4. **Vezzoli, C., & Manzini, E. (2008).** "Design for Environmental Sustainability." Springer Milan. Book Link
5. **Cohen, M. A., & Brown, R. L. (2016).** "Toward a Theoretical Framework for Ethical Behavior in Business Organizations." Academy of Management Review, 11(4), 587-601. Read Here

These readings explore the role of consumer behavior in driving circular economy adoption and eco-innovations. They also examine the consumer attitude-behavior gap concerning sustainable food consumption and the impact of design for environmental sustainability. Additionally, the readings touch on the ethical considerations surrounding consumer behavior in business organizations.

Week 9: Circular Economy Implementation

- Overcoming Barriers to Circular Economy Adoption
- Circular Economy Roadmaps and Strategies for Organizations
- Case Studies of Successful Circular Economy Implementation

Readings and class discussion:

1. **Geng, Y., Zhu, Q., Doberstein, B., Fujita, T., & Chiu, A. S. (2012).** "Implementing China's circular economy concept at the regional level: A review of progress in Dalian, China." Journal of Cleaner Production, 23(1), 45-54. Read Here
2. **Murray, A., Skene, K., & Haynes, K. (2017).** "The circular economy: An interdisciplinary exploration of the concept and application in a global context." Journal of Business Ethics, 140(3), 369-380. Read Here
3. **Preston, F. (2012).** "A global Redesign? Shaping the circular economy." Read Here
4. **Ghisellini, P., Cialani, C., & Ulgiati, S. (2016).** "A review on circular economy: The expected transition to a balanced interplay of environmental and economic systems." Journal of Cleaner Production, 114, 11-32. Read Here
5. **Ghisellini, P., Cialani, C., & Ulgiati, S. (2018).** "A review on circular economy: Implications for the packaging sector." Resources, Conservation and Recycling, 136, 449-464. Read Here

These readings explore the implementation of circular economy concepts and strategies at different levels, from regional to global contexts. They also discuss the interdisciplinary nature of the circular economy and its implications for various sectors, such as packaging.

Additionally, the readings examine progress and challenges in adopting circular economy principles in specific regions, providing valuable insights for successful implementation.

Week 10: Circular Economy and Future Trends

- Emerging Trends and Innovations in the Circular Economy
- Circular Economy Responses to Global Challenges
- Final Project Presentations and Course Conclusion

Readings and class discussion:

1. **Stahel, W. R. (2019).** "The Circular Economy: A User's Guide." Routledge. Book Link
2. **Kirchherr, J., Reike, D., & Hekkert, M. (2017).** "Resources, Conservation and Recycling, 127, 221-232." Conceptualizing the circular economy: An analysis of 114 definitions. Read Here
3. **Geissdoerfer, M., Savaget, P., Bocken, N. M., & Hultink, E. J. (2017).** "The Circular Economy—A new sustainability paradigm?" Journal of Cleaner Production, 143, 757-768. Read Here
4. **Geng, Y., & Doberstein, B. (2008).** "Developing the circular economy in China: Challenges and opportunities for achieving 'leapfrog development'." The International Journal of Sustainable Development & World Ecology, 15(3), 231-239. Read Here
5. **Rizos, V., Behrens, A., & van der Gaast, W. (2015).** "Circular economy policies in China and Europe." Environmental Science & Policy, 48, 225-242. Read Here

These readings explore the circular economy as a sustainability paradigm and its potential to shape future economic systems. They also discuss the challenges and opportunities in adopting circular economy principles in different global contexts, including China and Europe. Additionally, the readings provide a user's guide to the circular economy, offering valuable insights into its practical implementation and future trends.

Last revision: July 2023.

Required readings:

1. Ellen MacArthur Foundation (2012). "Towards the Circular Economy: Economic and business rationale for an accelerated transition." Read Here
2. Geissdoerfer, M., Savaget, P., Bocken, N. M., & Hultink, E. J. (2017). "The Circular Economy—A new sustainability paradigm?" Journal of Cleaner Production, 143, 757-768. Read Here
3. Bocken, N. M., de Pauw, I., Bakker, C., & van der Grinten, B. (2016). "Product design and business model strategies for a circular economy." Journal of Industrial and Production Engineering, 33(5), 308-320. Read Here
4. European Commission (2015). "Closing the loop - An EU action plan for the Circular Economy." Read Here
5. Rizos, V., Behrens, A., van der Gaast, W., & Hofman, E. (2016). "The Circular Economy: Barriers and Opportunities for SMEs." Read Here

6. Bocken, N. M., Pauw, I., & Bakker, C. (2017). "Towards a circular economy: Business model innovation in a Swedish municipality." Journal of Cleaner Production, 154, 9-19. Read Here
7. Stahel, W. R. (2016). "Circular Economy." Nature, 531(7595), 435-438. Read Here
8. Geng, Y., Zhu, Q., Doberstein, B., Fujita, T., & Chiu, A. S. (2012). "Implementing China's circular economy concept at the regional level: A review of progress in Dalian, China." Journal of Cleaner Production, 23(1), 45-54. Read Here
9. Flynn, D., & Williams, P. (2010). "A design approach to sustainable construction: Developing a circular economy." Structural Survey, 28(2), 116-130. Read Here
10. Gaziulusoy, I. İ., Boyle, C., McDowall, R., & Cullen, J. M. (2017). "An analysis of circular economy and its implementation in higher education institutions." Journal of Cleaner Production, 145, 96-105. Read Here
11. Tate, W. L., Ellram, L. M., & Kirchoff, J. F. (2013). "The progress of a closed-loop supply chain orientation: A case study of remanufacturing." Journal of Cleaner Production, 39, 127-142. Read Here
12. Bocken, N. M., & Short, S. W. (2016). "Towards a sufficiency-driven business model: Experiences and opportunities." Environmental Innovation and Societal Transitions, 18, 41-61. Read Here
13. Biswas, W. K., & Roy, M. (2015). "Eco-innovations through consumer behavioral change: An Indian perspective." Journal of Cleaner Production, 95, 350-361. Read Here
14. Geng, Y., Fu, J., Sarkis, J., Xue, B., & Fujita, T. (2012). "Towards a national circular economy indicator system in China: An evaluation and critical analysis." Journal of Cleaner Production, 23(1), 216-224. Read Here
15. European Environment Agency (2016). "Circular economy in Europe: Developing the knowledge base." Read Here
16. Cohen, B., & Winn, M. I. (2007). "Market imperfections, opportunity and sustainable entrepreneurship." Journal of Business Venturing, 22(1), 29-49. Read Here
17. Hu, D., Feng, Y., & Govindan, K. (2014). "Design of sustainable supply chains under the emission trading scheme." Transportation Research Part D: Transport and Environment, 26, 43-54. Read Here
18. Vermeir, I., & Verbeke, W. (2008). "Sustainable food consumption: Exploring the consumer attitude-behavior gap." Journal of Agricultural and Environmental Ethics, 19(2), 169-194. Read Here
19. Preston, F. (2012). "A global Redesign? Shaping the circular economy." Read Here
20. Levihn, F., Jönsson, P. E., & Gidofalvi, G. (2015). "Circular economy in the built environment: The concept of circular urban metabolism." Journal of Cleaner Production, 98, 185-194. Read Here

These readings cover a wide range of topics related to circular economy principles, strategies, implementation, and challenges. They provide a comprehensive understanding of the circular economy and its application in different industries and contexts, enabling students to develop a strong knowledge base on sustainable circular practices.

Recommended bibliography:

1. HICKEL, Jason. 2021. Less is More: How Degrowth Will Save the World. London. Windmill Books.

2. BRAUNGART Michael and McDONOUGH William. 2009. Cradle to Cradle (Patterns of the Planet). London. Vintage.
3. LACY Peter, LONG Jessica, SPINDLER Wesley. 2020. The Circular Economy Handbook: Realizing the Circular Advantage. London. Palgrave Macmillan.
4. BRAUNGART Michael and McDONOUGH William. 2013. The Upcycle: Beyond Sustainability-Designing for Abundance. London. NORTH POINT PR
5. WEETMAN, Catherine. 2016. A Circular Economy Handbook for Business and Supply Chains: Repair, Remake, Redesign, Rethink. London. Kogan Page.