

Syllabus of Record

Program: CET Taiwan

Course Code / Title: (TP/ENVR 340) Circular Economy and Sustainable Business Models

Contact Hours: 45

Recommended Credits: 3

Primary Discipline / Suggested Cross Listings: Environmental Studies / Business, Economics, Public Policy

Language of Instruction: English

Prerequisites / Requirements: Prior coursework in sustainable business is recommended but not required.

Description

Manufacturing is a major source of carbon emissions globally, accounting for 23% in the US and producing 880 million tonnes of CO₂ equivalents annually in Europe. In developed Asian countries, it can contribute up to 40% of a country's total emissions. Despite these challenges, different regions are developing unique solutions. Taiwan, with its concentrated manufacturing sector and export-driven economy, offers a valuable case study in sustainable practices and circular economy initiatives, facilitated by its compact size and early adoption of global sustainability trends.

This course explores the circular economy through the lens of Taiwan's manufacturing sector, offering a unique perspective on sustainable business practices in a compact, export-driven economy. Students examine how circular principles reshape manufacturing processes, regulatory environments, and business models. Through a combination of case studies, field visits to companies implementing circular practices, and hands-on workshops, students analyze global industry trends and develop innovative solutions for sustainable manufacturing. The course leverages Taiwan's early adoption of sustainability initiatives to provide valuable insights applicable worldwide, covering topics from waste minimization and product longevity to the transformation of traditional business models in various industries.

Objectives

By the end of the course, students are expected to:

- Understand the key principles of the circular economy and how they are being applied within Taiwan's manufacturing industry.
- Analyze the impact of Taiwan's regulatory environment and export-oriented economy on the adoption of circular economy practices.
- Critically evaluate case studies from global industries to identify successful strategies and challenges in implementing circular economy models across different contexts.
- Develop a global perspective on the application of circular economy principles, considering diverse regulatory, economic, and cultural environments.
- Formulate innovative solutions for the circular transformation of manufacturing processes, adaptable to both local and international contexts.

Course Requirements

Students are expected to attend each class as outlined in the CET Attendance Policy. Active participation is essential for success in this course. Students are required to complete all assigned readings or viewings before each class session to fully engage in discussions. Reading assignments typically average 50-80

pages per class. In addition, students must come prepared to contribute thoughtfully during class, drawing on both the assigned materials and their own insights.

Graded assignments for the course include the following:

- **Class Participation:** Participation is not merely attendance; students must actively engage in discussions by contributing insights, asking questions, and responding to peers' comments. This includes being prepared to discuss the assigned readings and bring in perspectives from both global and local contexts.

Class Participation Grading Rubric

	A – 90-100% Exemplary	B – 80-89% Proficient	C – 70-79% Developing	D – 60-69% Unacceptable	F – 0-59% Missing
Frequency of class participation	Actively contributes 2+ times per meeting	Actively contributes at least 1 time per meeting	Actively contributes at least half of the time during term	Actively contributes less than half of the time during term	Does not contribute
Quality of class participation	Contribution is always thoughtful, accurate, and constructive, frequently interacting with peers	Contribution is mostly thoughtful, accurate, and constructive, usually interacting with peers	Contribution is somewhat thoughtful, accurate, and constructive, sometimes interacting with peers	Contribution is rarely thoughtful, accurate, and constructive, rarely interacting with peers	Does not contribute or interact with peers
Level of class preparation	Always fully prepared and on task	Mostly prepared and on task	Somewhat prepared and on task	Rarely prepared and on task	Consistently unprepared and not on task

- **Case Study Analysis:** Over the course of the semester, students complete three (3) detailed case study analyses, each focusing on a different aspect of the circular economy in manufacturing. These case studies will require students to critically analyze specific companies or industries using the theoretical frameworks and real-world examples discussed in class. Each analysis should be 800-1,000 words. For each case study, selected students will be asked to present their findings to the class in a 10-minute presentation, followed by a discussion.

Evaluation criteria include:

- Content Accuracy: Clear description of the company or industry's background, challenges, and circular economy practices.
 - Depth of Analysis: Effective application of course theories and case-specific data for in-depth evaluation.
 - Structure and Clarity: Logical organization with well-supported arguments and clear writing.
- **Field Class Reflections:** Students participate in three field classes to various companies or organizations engaged in circular economy practices. Following each field class, students submit a 1,000-word reflection paper analyzing the sustainability strategies observed and their potential applications in other contexts. As with the case studies, selected students will present their reflections to the class. Students will choose two out of the three sites to write a reflection paper for.

Evaluation criteria include:

- Observation and Understanding: Accurate and comprehensive description of observed practices and strategies.
 - Stakeholder Analysis: Evaluation of the organization's roles and contributions to the circular economy.
 - Sustainability Assessment: Critical analysis of observed actions, with suggestions for improvement.
 - Ethical Considerations: Analysis of ethical challenges and implications of observed practices.
- **Circular Economy in Practice: Industry Trends:** In the final part of the course, each student completes a comprehensive project that examines current trends in the circular economy within a specific industry. This project will involve both a written report (2,500 words) and a class presentation. Students are expected to integrate their learning from the entire course, including readings, discussions, case studies, and field classes, to propose innovative solutions or future directions for circular economy practices.

Written Report: Students will submit a 2,500-word report synthesizing course learnings from readings, case studies, and field visits. Evaluation criteria include:

- Research Depth and Breadth: Comprehensive analysis of current industry trends and challenges.
- Integration of Learning: Effective incorporation of theoretical knowledge and practical insights.
- Clarity and Coherence: Well-organized arguments supported by evidence.

Oral Presentation: Students will present their findings and insights. Evaluation criteria include:

- Content Accuracy and Relevance: Clear and concise presentation of key findings and implications.
- Delivery and Engagement: Effective communication, including visual aids and audience engagement.
- Q&A Skills: Effective response to questions from peers and instructor.

Grading

- Class Participation 20%
- Case Study Analysis (3 at 10%) 30%
- Field Class Reflections (2 at 10%) 20%
- Circular Economy in Practice: Industry Trends: 30%
 - Written report 20%
 - Oral presentation 10%

Readings & Resources

Acaroglu, L. (2014). *Paper beats plastic? How to rethink environmental folklore* [Video]. YouTube.

<https://youtu.be/2L4B-Vpx1A>

Berwald, A., Dimitrova, G., Feenstra, T., Onnekink, J., Peters, H., Vyncke, G., & Ragaert, K. (2021). Design for circularity guidelines for the EEE sector. *Sustainability*, 13(7), 3923-3934.

<https://doi.org/10.3390/su13073923>

Circle Economy. (2020). *Jobs & skills in the circular economy: State of play and future pathways*. Retrieved August 26, 2024, from <https://www.circle-economy.com/resources/jobs-skills-in-the-circular-economy-state-of-play-and-future-pathways>

Circle Economy. (2024). *The circularity gap report 2024*. Retrieved August 26, 2024, from

<https://www.circularity-gap.world/2024>

CircuitNord. (2020). *WB1: Circular economy sustainability screening*. Retrieved August 26, 2024, from

<https://circuitnord.com/>

CircuitNord. (2020). *WB2: Circular economy business modelling*. Retrieved August 26, 2024, from

<https://circuitnord.com/>

CircuitNord. (2020). *WB3: Circular product design and development*. Retrieved August 26, 2024, from

<https://circuitnord.com/>

CircuitNord. (2020). *WB4: Smart circular economy*. Retrieved August 26, 2024, from <https://circuitnord.com/>

CircuitNord. (2020). *WB5: Closing the loop for a circular economy*. Retrieved August 26, 2024, from

<https://circuitnord.com/>

CircuitNord. (2020). *WB6: Collaborating and networking for a circular economy*. Retrieved August 26, 2024,

from <https://circuitnord.com/>

Circular Electronics Partnership. (2024). *The circular electronics roadmap 2.0*. Retrieved August 26, 2024,

from <https://cep2030.org/the-circular-electronics-roadmap/>

Ellen MacArthur Foundation. (2022). *Circular public procurement: A framework for cities*. Retrieved August

26, 2024, from <https://www.ellenmacarthurfoundation.org/circular-public-procurement/a-framework-for-cities>

- Ellen MacArthur Foundation. (2024). *Fashion and the circular economy – Deep dive*. Retrieved August 26, 2024, from <https://www.ellenmacarthurfoundation.org/fashion-and-the-circular-economy-deep-dive>
- Ellen MacArthur Foundation. (2022). *How the circular economy can help us stay within planetary boundaries*. Retrieved August 26, 2024, from <https://www.ellenmacarthurfoundation.org/articles/how-the-circular-economy-can-help-us-stay-within-planetary-boundaries>
- Ellen MacArthur Foundation. (2019). *Reusable packaging business models*. Retrieved August 26, 2024, from <https://www.ellenmacarthurfoundation.org/reusable-packaging-business-models>
- Ellen MacArthur Foundation. (2024). *Saving office furniture from landfill: Deartree*. Retrieved August 26, 2024, from <https://www.ellenmacarthurfoundation.org/circular-examples/saving-office-furniture-from-landfill-deartree>
- Ellen MacArthur Foundation. (2024). *Schools of thought that inspired the circular economy*. Retrieved August 26, 2024, from <https://www.ellenmacarthurfoundation.org/schools-of-thought-that-inspired-the-circular-economy>
- Ellen MacArthur Foundation. (2023). *Time to act: Seizing the potential of US circular economy innovation*. Retrieved August 26, 2024, from <https://www.ellenmacarthurfoundation.org/articles/time-to-act-seizing-the-potential-of-us-circular-economy-innovation>
- Ellen MacArthur Foundation. (2024). *What is a circular economy?* Retrieved August 26, 2024, from <https://www.ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview>
- Geyer, R., Jambeck, J. R., & Law, K. L. (2017). Production, use, and fate of all plastics ever made. *Science Advances*, 3(7), e1700782. <https://doi.org/10.1126/sciadv.1700782>
- TED-Ed. (2011). *Explaining the circular economy and how society can re-think progress* [Video]. YouTube. <https://youtu.be/zCRKvDyyHml>
- Science Channel. (2021). *Life cycle assessment (LCA) for beginners* [Video]. YouTube. https://youtu.be/2s8wqa_lvoQ
- Nordic Innovation. (2024). *Circular business models for the manufacturing industry*. Retrieved August 26, 2024, from <https://www.nordicinnovation.org/>
- Nordic Innovation. (2024). *Nordic circular economy playbook*. Retrieved August 26, 2024, from <https://pub.nordicinnovation.org/Nordic-Circular-Economy-Playbook/#>
- Rockström, J. (2020). *10 years to transform the future of humanity -- or destabilize the planet* [Video]. YouTube. <https://www.youtube.com/watch?v=8SI28fkrozE>
- Rockström, J. (2023). *A safe and just future for humanity on earth* [Video]. YouTube. <https://youtu.be/p9ej7yHxaps>

- Romero-Perdomo, F., Carvajalino Umaña, J. D., Moreno-Gallego, J., Ardila, N., & González Curbelo, M. Á. (2022). Research trends on climate change and circular economy from a knowledge mapping perspective. *Sustainability*, 14(1), 521-538. <https://doi.org/10.3390/su14010521>
- Santa Maria, T., Vermeulen, W., & Baumgartner, R. (2020). Framing and assessing the emergent field of business model innovation for the circular economy: A combined literature review and multiple case study approach. *Sustainable Production and Consumption*, 26, 872-891. <https://doi.org/10.1016/j.spc.2020.12.037>
- Sander, K., Zimmermann, T., Jepsen, D., & Wagner, L. (2020). Extending the use phase of EEE: Potential environmental benefits of extending the use phase of electrical and electronic equipment and implications on the waste hierarchy. *ResearchGate*. <https://doi.org/10.13140/RG.2.2.11541.81122>
- Stegmann, P., Daioglou, V., Londo, M., & Faaij, A. (2022). Plastic futures and their CO2 emissions. *Nature*, 612(7940), 272–276. <https://doi.org/10.1038/s41586-022-05422-5>
- Suppipat, S., & Hu, A. H. (2022). A scoping review of design for circularity in the electrical and electronics industry. *Resources, Conservation & Recycling Advances*, 13, 200064. <https://doi.org/10.1016/j.rcradv.2022.200064>
- Taqi, S. (2023). Challenges and opportunities in the management of electronic waste and its impact on human health and environment. *Sustainability*, 15(3), 1831-1859. <https://www.mdpi.com/2071-1050/15/3/1837>
- Tumu, K., Vorst, K., & Curtzwiler, G. (2023). Global plastic waste recycling and extended producer responsibility laws. *Journal of Environmental Management*, 348, 1-9. <https://doi.org/10.1016/j.jenvman.2023.119242>
- Velenturf, A., & Purnell, P. (2021). Principles for a sustainable circular economy. *Sustainable Production and Consumption*, 27, 1437-1457. <https://doi.org/10.1016/j.spc.2021.02.018>
- World Economic Forum. (2023). *The "no-excuse" framework to accelerate the path to net-zero manufacturing and value chains*. Retrieved August 26, 2024, from <https://www.weforum.org/publications/the-no-excuse-framework-to-accelerate-the-path-to-net-zero-manufacturing-and-value-chains/>

Outline of Course Content

Topic 1 – Introduction to Circular Economy

- Explore the origins, concepts, and applications of the circular economy in policy and business, emphasizing resource reuse, product longevity, and waste minimization.

Topic 2 – Changes in the Natural Environment and Our Relationship with It

- Under the influence of the Anthropocene, our planet has undergone significant changes. Six out of nine planetary boundaries have been exceeded. We will discuss the causes of climate change and its impact on the global decarbonization movement.

Topic 3 – Application of PESTEL Tool in the Era of Sustainable Transformation

- PESTEL is a long-standing tool used to systematically analyze changes in politics, economics, society, technology, environment, and law. We will focus on the changes in the environmental and legal aspects during the era of sustainable transformation.

Topic 4 – Analysis of Corporate Sustainability Competitiveness

- Discuss how companies can enhance their competitiveness and profitability by reducing risks, cutting costs, increasing revenue, and enhancing intangible assets through sustainable development.

Topic 5 – Field Studies of circular economy at work:

- Lighting Company with Leasing Model: A field class to a lighting company that implements a circular economy model, focusing on the advantages of a leasing business model.
- A company wish has distinctive circular economy features.
- Electronic Waste Recycling Plant: A field class to an electronic waste recycling plant to understand the recycling and processing of electronic waste and explore the regeneration of green energy.

Topic 6 – Case Study of circular economy in specific industries

- Bicycle and Furniture Industries
- Textile and Electronics Industries

Topic 7 – Circular Economy Strategies for Manufacturing

- Introduce different stages of the manufacturing value chain and analyze five circular economy strategies along with their corresponding solutions.
- Explore the similarities and differences in the development of the circular economy across three basic manufacturing business models and analyze the transformation needs of responsible departments within the value chain.

Topic 8 – Circular Transformation Simulation Workshop

- Simulate a transformation scenario for an umbrella manufacturer and design three different circular economy solutions to innovate its business model.

Topic 9 – Circular Economy in Practice: Industry Trends

- Analyze a recent topic related to the circular economy, covering policies, business environments, and practices of specific companies.

Topic 10 – Reshaping Job Skills in Circular Transformation

- Discuss how the circular economy is reshaping the labor market and share possible sustainable transformation paths for participants.

Topic 11 – Future Outlook of the Circular Economy

- Explore future trends in the circular economy and their impact on the global market.