

COURSE OUTLINE

(1) General information

FACULTY/SCHOOL	TECHNOLOGY		
DEPARTMENT	ENVIRONMENTAL SCIENCES		
LEVEL OF STUDY	<i>Undergraduate</i>		
COURSE UNIT CODE	NEW COURSE	SEMESTER	4 th
COURSE TITLE	CIRCULAR ECONOMY AND SUSTAINABLE DEVELOPMENT		
INDEPENDENT TEACHING ACTIVITIES in case credits are awarded for separate components/parts of the course, e.g. in lectures, laboratory exercises, etc. If credits are awarded for the entire course, give the weekly teaching hours and the total credits		WEEKLY TEACHING HOURS	CREDITS
THEORETICAL BACKGROUND		5	5
COURSE TYPE Background knowledge, Scientific expertise, General Knowledge, Skills Development	BACKGROUND		
PREREQUISITE COURSES:	NO		
LANGUAGE OF INSTRUCTION & EXAMINATION/ASSESSMENT:	GREEK		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	YES		
COURSE WEBSITE (URL)			

(2) LEARNING OUTCOMES

<p>Learning Outcomes <i>The course learning outcomes, specific knowledge, skills and competences of an appropriate (certain) level, which students will acquire upon successful completion of the course, are described in detail. It is necessary to consult:</i></p> <p>APPENDIX A</p> <ul style="list-style-type: none"> • <i>Description of the level of learning outcomes for each level of study, in accordance with the European Higher Education Qualifications' Framework.</i> • <i>Descriptive indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and</i> <p>APPENDIX B</p> <ul style="list-style-type: none"> • <i>Guidelines for writing Learning Outcomes</i>
<p>The circular economy is a productive and consumer model that aims to increase the efficiency of raw materials, through the use of materials for a longer period of time, while minimizing the use of natural resources. This is in stark contrast to the commonly used linear economic model, as in the "production-consumption-disposal" chain the last stage is replaced by "reuse". Contrary to popular belief, the circular economy is not a new way of recycling waste. It is a completely different approach, a radical change of thinking and behavior. The transition to a circular economy is a systemic change. The circular economy covers the need to correct the principles of sustainable development, as they are to this day, which tends to focus on ecological efficiency and minimizing environmental damage, failing to address</p>

the expediency of long-term sustainable sustainability losses and ignoring that negative effects instead of eliminating the root causes of unsustainability.

The aim of the course is:

1. Students to understand the basic concepts of the circular economy developed in the course, as well as the principles on which its application is based.
2. Students to be able to apply the knowledge they have acquired in the course to solving technical problems, considering that the environment is not an unlimited reservoir or a recipient of pollution.
3. Students should be trained in designing solutions that prevent waste generation and not their production and subsequent treatment.
4. The students to be trained in the use of eco-innovative technical solutions, for the conversion of waste into productive processes into useful secondary resources.
5. Students to be able to balance social, economic and environmental goals in the short, medium and long term, as equality and human well-being can hardly be achieved.
6. The students to be informed about the legal and institutional framework governing the implementation of circular economic policies in Greece and the EU.

General Competences

Taking into consideration the general competences that students/graduates must acquire (as those are described in the Diploma Supplement and are mentioned below), at which of the following does the course attendance aim?

<i>Search for, analysis and synthesis of data and information by the use of appropriate technologies, Adapting to new situations</i>	<i>Project planning and management</i>
<i>Decision-making</i>	<i>Respect for diversity and multiculturalism</i>
<i>Individual/Independent work</i>	<i>Environmental awareness</i>
<i>Group/Team work</i>	<i>Social, professional and ethical responsibility and sensitivity to gender issues</i>
<i>Working in an international environment</i>	<i>Critical thinking</i>
<i>Working in an interdisciplinary environment</i>	<i>Development of free, creative and inductive thinking</i>
<i>Introduction of innovative research</i>	<i>.....</i>
	<i>(Other.....citizenship, spiritual freedom, social awareness, altruism etc.)</i>
	<i>.....</i>

- Adaptation to new situations
- Work in an interdisciplinary environment
- Production of new research ideas
- Respect for diversity and multiculturalism
- Respect for the natural environment
- Practice criticism and self-criticism
- Promoting free, creative and inductive thinking

(3) COURSE CONTENT

Theory

1. Introduction - Definitions.
2. Origin of the circular economy.
3. Principles and implementation of the circular economy worldwide.
4. Circular economy: A new business development model.
5. Sustainability in the linear and circular economy.

6. Go to circularity.
7. Circular economy on a small scale.
8. Circular economy and consumption. Consumer responsibility and green public procurement.
9. Circular economy and waste management. Recovery of resources and minimization of environmental impacts.
10. Circular economy on a medium scale.
11. Circular economy on a large scale.
12. Eco-cities.
13. Cooperating consumption models.
14. Dissociating economic growth from environmental impacts.

(4) TEACHING METHODS-ASSESSMENT

<p>MODES OF DELIVERY Face-to-face, in-class lecturing, distance teaching and distance learning etc.</p>	<ul style="list-style-type: none"> • Lectures in the classroom or by distance • Team discussion 											
<p>USE OF INFORMATION AND COMMUNICATION TECHNOLOGY Use of ICT in teaching, Laboratory Education, Communication with students</p>	<ul style="list-style-type: none"> • Powerpoint. • View video material • e-mail. • e-class 											
<p>COURSE DESIGN Description of teaching techniques, practices and methods: Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, Internship, Art Workshop, Interactive teaching, Educational visits, projects, Essay writing, Artistic creativity, etc.</p> <p>The study hours for each learning activity as well as the hours of self-directed study are given following the principles of the ECTS.</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;"><i>Activity/Method</i></th> <th style="text-align: center;"><i>Semester workload</i></th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td style="text-align: center;">65</td> </tr> <tr> <td>Theory study</td> <td style="text-align: center;">45</td> </tr> <tr> <td>Team working</td> <td style="text-align: center;">15</td> </tr> <tr> <td>Course total (25 hours of workload per credit unit)</td> <td style="text-align: center;">125</td> </tr> </tbody> </table>		<i>Activity/Method</i>	<i>Semester workload</i>	Lectures	65	Theory study	45	Team working	15	Course total (25 hours of workload per credit unit)	125
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<p>STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS Detailed description of the evaluation procedures:</p> <p>Language of evaluation, assessment methods, formative or summative (conclusive), multiple choice tests, short- answer questions, open-ended questions, problem solving, written work, essay/report, oral exam, presentation, laboratory work, other.....etc.</p> <p>Specifically, defined evaluation criteria are stated, as well as if and where they are accessible by the students.</p> <p><u>Students are assessed in Greek or English. The final grade is formed by tests which include:</u></p> <ul style="list-style-type: none"> • Written exam: 70% of the final grade (A) • Tasks: 30% of the final grade (B) <p style="text-align: center;">Final grade = 70% (A) + 30% (B)</p>												

(5) SUGGESTED BIBLIOGRAPHY:

-Suggested bibliography

- McDonough W, Braungart M. 2010. Cradle to Cradle: remaking the way we make things. Eboo: MacMillan.
- Jackson T. 2016. Prosperity without growth: foundations for the economy of tomorrow. London: Routledge.
- Kirchherr J, Reike D, Hekkert M. 2017a. Conceptualizing the circular economy: an analysis of 114 definitions. Resour Conserv Recycl. 127:221–232.
- Kopnina H, Blewitt J. 2018. Sustainable business: key issues. 2nd ed. New York (NY): Routledge.
- Murray A, Skene K, Haynes K. 2017. The circular economy: an interdisciplinary exploration of the concept and application in a global context. J Bus Ethics. 140(3):369–380.
- Towards the Circular Economy: Accelerating the scale-up across global supply chains. World Economic Forum. Prepared in collaboration with the Ellen MacArthur Foundation and McKinsey & Company, January 2014.
- Lieder M, Rashid A. 2016. Towards circular economy implementation: a comprehensive review in context of manufacturing industry. J Cleaner Prod. 115:36–51.
- Vieira P. 2016. Is overpopulation a growth? The pathology of permanent expansion. Oxford Literary Rev. 38(1):67–83.
- <https://www.ellenmacarthurfoundation.org/programmes/education/>, Ellen MacArthur Foundation. n.d. [accessed 2018 April 4].
- Haas, W., Krausmann, F., Wiedenhofer, D., Heinz, M., 2015. How circular is the global Economy? an assessment of material flows, waste production, and recycling in the european union and the world in 2005. J. Ind. Ecol. 19, 765e777. <https://doi.org/10.1111/jiec.12244>.
- Το κλείσιμο του κύκλου – Ένα σχέδιο δράσης της ΕΕ για την κυκλική οικονομία. Βρυξέλλες, 2.12.2015 COM(2015) 614 final.
- Το κλείσιμο του κύκλου – Ένα σχέδιο δράσης της ΕΕ για την κυκλική οικονομία. Βρυξέλλες, 2.12.2015 COM(2015) 614 final, ANNEX 1.
- Δέσμη μέτρων για την κυκλική οικονομία. Βρυξέλλες, 17.3.2016, COM(2016) 157 final, 2016/0084 (COD).
- ACHIEVING ‘GROWTH WITHIN’, Ellen MacArthur Foundation.
- Επόμενα βήματα για ένα βιώσιμο ευρωπαϊκό μέλλον Ευρωπαϊκή δράση για την αειφορία, Στρασβούργο, 22.11.2016, COM(2016) 739 final.