

Waste Management

2015/2016

Code: 42408

ECTS Credits: 6

Degree	Type	Year	Semester
4313784 Interdisciplinary Studies in Environmental, Economic and Social Sustainability	OT	0	1

Contact

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Use of languages

Principal working language: english (eng)

Teachers

Montserrat Sarra Adroguer

Teresa Gea Leiva

Prerequisites

No specific knowledge required.

Objectives and Contextualisation

Provide the knowledge needed to manage waste as a resource, energy saving and reduction of greenhouse gas emissions (GHG).

Skills

- Analyse, summarise, organise and plan projects related to the environmental improvement of product, processes and services
- Communicate and justify conclusions clearly and unambiguously to both specialised and non-specialised audiences.
- Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
- Work in an international, multidisciplinary context.

Learning outcomes

1. Choose and propose the most sustainable waste management system under current legislation and the objectives of international policies.
2. Communicate and justify conclusions clearly and unambiguously to both specialised and non-specialised audiences.
3. Estimate greenhouse gas emissions attributable to waste.
4. Estimate the main environmental impacts of waste management systems, whether urban, industrial or agricultural.
5. Quantify the chances of reducing environmental impacts and GHG on the basis of new technologies, methodologies and waste management systems.
6. Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.

7. Work in an international, multidisciplinary context.

Content

Block 1 Unit operations for the use of waste as raw materials and emissions of greenhouse gases (GHG).

- Reduction. Collection. Transport. Compaction. Valorization. Sorting.
- Recyclable materials: plastic, glass, paper and cardboard, cans, batteries and accumulators. Organic matter. Other recyclable materials.
- Recycling plants. Eco-parks and Recovery areas.
- Landfills and estimation of their emissions.

Block 2 Indicators.

- GHG quantification methodologies for the waste sector (IPCC, LCA ...)
- Waste classification. Definition of a management plan.
- Emissions generated and/or reduced due to waste management that affects other sectors: transport, industry, energy. CO2 credits
- Saving energy and material recycling and recovery of materials and energy.
- Software modeling and measurement: LCA study, CO2 equivalent calculator, Landgem

Block 3 Sustainable management of urban, agricultural and industrial waste

- Applying Industrial Ecology tools (industrial symbiosis, flows exchanging, MFA, LCA Exegetic Analysis, Ecodesign, carbon footprint,) for designing innovative and sustainable system for waste management.
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Methodology

Lectures/oral expositions

Classroom practices

Seminars

Preparation of reports

Autonomous activity

Reading reports/papers of interest

Activities

Title	Hours	ECTS	Learning outcomes
Type: Directed			
Lectures	36	1.44	
Type: Supervised			

Seminars/Oral Expositions	10	0.4
Visit to industrial plants	15	0.6
Type: Autonomous		
Preparation of reports	25	1
Reading of reports/papers	20	0.8
Self-study	30	1.2

Evaluation

Students must submit essays or reports which will be prepared as a group or individually. Some works can be presented / discussed in class (50%).

Written exam (50%).

The minimum mark required for each item is 40% for obtaining the final mark.

Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Delivered reports	40 %	10	0.4	1, 4, 6
Exams	50 %	2	0.08	1, 4, 3, 5
Oral expositions of the reports	10 %	2	0.08	2, 7

Bibliography

- Materiales del campus virtual de la UAB. (intranet UAB, campus virtual)
- Handbook Zero Waste, ZERO WASTE PROJECT (1G-MED08-533).
http://icta.uab.cat/ecotech/zero_waste/Handbook/Final_Handbook.pdf
- MECOSIND. (intranet UAB, campus virtual)
- Cara Brower; Rachel Mallory; Zachary Ohlman. 2005. *Experimental Eco>Design*. Suiza. Editorial Rotovision. ISBN 2-88046-817
- Han Brezet, Carolien Van Hemel. 1997. *Ecodesign. A promising approach to sustainable production and consumption*. United Nations Publications, Paris Henrik Wenzel; Michael Hauschild; Leo Alting. 1997. *Environmental Assessment of Products (vol.1). Methodology, tools and case studies in product development*. Chapman & Hall
- Bilitewski, B., Härdtle, G., Marek, K., Weissbach, A., Boeddicker, H. Waste management. 1997. Springer (Germany).
- Lund, H. F., Manual McGraw-Hill de reciclaje. McGraw-Hill/Interamericana de España. 1996. (Madrid).
- Landreth, R. E., Rebers, P. A. Municipal Solid Wastes. Problems and Solutions. CRC Press, Inc., 1997. (USA)
- Solid waste processing and resource recovery. Handbook of environmental engineering. Vol 2. Lawrence K. Wang i Norman C. Pereira. Clifton (1980).
- Perry's Chemical engineer's handkook. (section 26-31).
- Roger Tim Haug. Compost engineering. Principles and practice. Technomic Publishing C.Inc. 1980. (Lancaster).
- Tchobanoglous, G., Theisen, H., Vigil, S. Gestión integral de residuos sólidos. McGraw-Hill. Madrid (1994).
- ISO 14040 Environmental management - Life cycle assessment - Principles and framework - 1998

- ISO 14041: Environmental management - Life cycle assessment - Goal and scope definition and life cycle inventory analysis - 1998
- ISO 14042: Environmental management - Life cycle assessment - Life cycle impact assessment - 2000
- ISO 14043: Environmental management - Life cycle assessment - Life cycle interpretation - 2000
- ISO 14048: Environmental Management-life cycle assessment-data documentation format; 2001.
- The Eco-indicator 99. A damage oriented method for Life Cycle Impact Assessment Methodology Report, PRé Consultants, Amersfoort - The Netherlands, 2000
- SimaPro 4.0 Database - PRé Consultants B.V. , Amersfoort (The Netherlands)

WEBS

CARBON FOOTPRINT TOOL OF WASTE MANAGEMENT IN EUROPE

<http://co2zw.eu.sostenipra.cat/>

Sustainable Design de la University of Surrey. www.cfsd.org.uk

Compra verdewww.uab.cat/compraverda

O2 www.o2.org

Center for Design de la RMIT University (Austràlia)

www.cfd.rmit.edu.au

Centre de Recursos Barcelona Sostenible

www.bcn.es/agenda21/crbs/

Agence de l'Environnement et de la Maitrise de l'Energie francesa. Productos reciclados

www.produits-recycles.com/

The EcoDesing Fundation (Sidney, Austràlia)

www.edf.edu.au/

Guia de ecodiseño UNEP

design.ntnu.no/fag/ecodesign/theory/theory_frames.htm

Grupo sostenibilidad y prevención ambiental. SOSTENIPRA

www.sostenipra.cat