Universitat Autònoma de Barcelona

2023/2024

Environmental Technology

Code: 106930
ECTS Credits: 6

Degree	Type	Year	Semester
2503743 Management of Smart and Sustainable Cities	FB	1	2

Contact

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Teaching groups languages

You can check it through this link. To consult the language you will need to enter the CODE of the subject.
Please note that this information is provisional until 30 November 2023.

Teachers

Raquel Barrena Gomez

Prerequisites

Having completed the subject of Matter Fluxes and the Water Cycle.

Objectives and Contextualisation

The objectives of this subject are:

1. To learn how to formulate non-steady-state material balances and energy balances in any system.
2. To delve into the waste cycle in cities and its treatment and valorization processes.

Learning Outcomes

- CM03 (Competence) Relate the knowledge and skills of the subject with those provided by other technicians in interdisciplinary teams.
- KM06 (Knowledge) Describe energy storage, generation and distribution systems, as well as the technologies, tools and techniques of environmental engineering.
- SM04 (Skill) Analyse the characteristics of the different technological and infrastructural components of the different systems in urban environments.

Content

1. Material balances without chemical reactions in non-steady state.
2. Macroscopic energy balances: Types of energy. Expression of the balance. Simplified forms. Energy balance in steady state. Heat energy balance. Mechanical energy balance.
3. Waste: Introduction and legal framework.
4. Municipal waste: Characteristics, fractions, and collection systems.
5. Organic waste: Composting and Methanization.
6. Waste treatment and valorization facilities.
7. Landfills.

Methodology

1. Non-chemical reaction material balances in non-steady state.
2. Macroscopic energy balances: Types of energy. Expression of the balance. Simplified forms. Stationary state energy balance. Heat energy balance. Mechanical energy balance.
3. Waste: Introduction and legal framework.
4. Municipal waste: Characteristics, fractions, and collection systems.
5. Organic waste: Composting and Methanization.
6. Waste treatment and valorization facilities.
7. Landfills.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Problem lessons	28	1.12	
Theory classes	28	1.12	
Type: Autonomous			
Study	47	1.88	
Work-assignments	40	1.6	

Assessment

Process and Scheduled Evaluation Activities

The subject includes the following evaluation activities:

Exams: There will be two midterm exams throughout the course. Each exam will account for 30% of the final grade. The exams will consist of questions related to the material covered in the face-to-face classes, including theory and problem-solving. The second midterm exam may include concepts assessed in the first midterm. Case study and in-class evaluation activities: 40% of the grade. This part of the grade is not recoverable. A minimum score of 3.5 is required in each part of the midterm exams to calculate the average. Otherwise, the student will need to take the recovery exam.

To pass the course through continuous assessment, a minimum average grade of 5 is required for the overall subject.

Evaluation Activities Schedule

At the beginning of the course, groups will be formed for group assignments, and evaluation activities will be scheduled during class hours.

Exams will be held according to the schedule set in the degree's exam calendar.

Recovery Process

The recovery process is exclusively for students who have not passed the course through continuous assessment.

The midterm exams are eliminatory if the grade is equal to or higher than 5. The calculation of the final grade in the recovery process will be done in the same way as in continuous assessment, following the same minimum grade criteria. Group work and in-class evaluation activities are not recoverable. Review Procedure for Grades

For each evaluation activity, a location, date, and time for review will be indicated, where the activity can be reviewed in person with the professor. In this context, appeals regarding the grade of the activity can be made and will be evaluated by the responsible teaching staff. If a student does not attend this review, the activity will not be reviewed at a later time.

Grades

The decision to grant an honors grade (MH) lies with the responsible teaching staff. UAB regulations state that MH can only be awarded to individuals who have obtained a final grade equal to or higher than 9.00. Up to 5% of the total enrolled students can receive an MH. In this subject, to be eligible for honors, in addition to the aforementioned criteria, a grade equal to or higher than 8.5 is required for each evaluation activity, and no exams need to be retaken.

If, after the recovery process, a final grade equal to or higher than 5 is obtained but with a grade lower than 3.5 in any of the exams, it will be evaluated as a fail, and the final grade will reflect the grade obtained in the recovery for the exam with the lower grade.

A student who, after continuous assessment, has not passed the subject and does not attend the recovery of the midterm exams will be considered as Not Evaluable.

Irregularities: Copying and Plagiarism

Copying in any evaluation activity will result in a failing grade of 3 out of 10, without the possibility of taking the recovery exam.

Evaluation of Repeating Students

No different evaluation system is planned for repeating students. However, the option to maintain the grade of the previous year's work and in-class evaluation activities will be considered, provided that the repetition is not due to plagiarism.

Unique assessment

Students who have accepted the unique assessment modality must take the following tests on the same day:

First, a summary exam of the subject.
Second, you will have to solve a series of exercises similar to those that have been worked on throughout the course
Finally, there will be an oral session where you will have to defend a previously agreed topic.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Exams	60	4	0.16	CM03, KM06, SM04
Work assignments and class activities	40	3	0.12	CM03, KM06, SM04

Bibliography

- *George Tchobanoglous, Hilary Theisen, Samuel A. Vigil. Gestión integral de residuos sólidos.* Editorial Mc Graw-Hill. 1994.
- Agència de Residus de Catalunya, www.arc.cat
- R. T. Haug. The Practical Handbook of Compost Engineering. Editorial CRC Press. 1993. (Disponible document electrònic: https://ebookcentral.proquest.com/lib/uab/detail.action?docID=5389526)
- Agència Europea del Medi Ambient, https://www.eea.europa.eu
- *Gilbert M. Masters Wendell P. Ela Pearson Introduccion a la ingenieria medioambiental* Prentice Hall. ISBN 978-84-8322-444-1. 2008
- Himmelblau D. (1989) "Basic principles and calculations in Chemical Engineering". Prentice-Hall
- Aucejo, A. i col. (1999) "Introducció a l'Enginyeria Química" Pòrtic. Biblioteca Universitària. Ed. Enciclopèdia Catalana.

Software

N/A