Universitat Autònoma de Barcelona

2020/2021

Basic Environmental Engineering

Code: 102819
ECTS Credits: 6

Degree	Type	Year	Semester
2501915 Environmental Sciences	OB	3	2

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

Contact

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Use of Languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Teachers

Adriana Artola Casacuberta
Xenia Juan Diaz
Raquel Barrena Gomez

Prerequisites

Students must be able to work in solving equations, chemical formulation, stoichiometry, to find out molecular we

Objectives and Contextualisation

- To understand some relevant environmental engineering processes analyzing unit operations involved.
- To perform mass and energy balances in environmental systems.
- To apply the concept of "ideal reactor" in environmental engineering.
- To understand the basic principles that underlie the most relevant biological treatments in environmental e

Competences

- Adequately convey information verbally, written and graphic, including the use of new communication and information technologies.
- Analyze and use information critically.

- Demonstrate adequate knowledge and use the most relevant environmental tools and concepts of biology, geology, chemistry, physics and chemical engineering.
- Demonstrate concern for quality and praxis.
- Demonstrate initiative and adapt to new situations and problems.
- Information from texts written in foreign languages.
- Learn and apply in practice the knowledge acquired and to solve problems.
- Teaming developing personal values regarding social skills and teamwork.
- Work autonomously

Learning Outcomes

1. Adequately convey information verbally, written and graphic, including the use of new communication and information technologies.
2. Analyze and use information critically.
3. Apply relevant knowledge of basic sciences to enable compression, the description and the solution of typical problems of environmental engineering.
4. Apply the basic principles on which is based environmental engineering and, more specifically, mass and energy balances.
5. Demonstrate concern for quality and praxis.
6. Demonstrate initiative and adapt to new situations and problems.
7. Distinguish different operations of reaction, separation, processing and transportation of materials and circulation of fluids in industrial processes involved in environmental engineering.
8. Information from texts written in foreign languages.
9. Learn and apply in practice the knowledge acquired and to solve problems.
10. Teaming developing personal values regarding social skills and teamwork.
11. Work autonomously

Content

1. INTRODUCTION TO ENVIRONMENTAL ENGINEERING

Principles. Unit operations. Continuous and discontinuous operations. Steady and unsteady state. Type of reacto

2. MASS BALANCES APPLIED IN SYSTEMS WITHOUT REACTION

Concept of balance. Mass balances in systems without reaction under steady state operation. Balances in multip

3. MASS BALANCES APPLIED IN SYSTEMS WITH REACTION

Stoichiometry. Measurement of changes in composition. The rate of reaction. Ideal reactors' design equations. C

4. ENERGY BALANCES

Forms of energy. The general energy balance. Simplified forms. Energy balance at steady state. Heat energy bal

5. BIOLOGICAL PROCESSES IN ENVIRONMENTAL ENGINEERING

Classification of biological processes. Wastewater treatment: activated sludge. Anaerobic digestion. Composting.

Methodology

Theory lessons: presentation of the different topics of the syllabus. Examples of application for these topics are a
Problem classes: resolution of exercicies related to the subject. Discussi
Seminars: practical application of the basis of environmental engineering

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Problems classes: Resolution of problems corresponding to the subject. Discussion with the students about the solution strategies and their execution.	14	0.56	3, 4, 9, 6, 5, 7, 8, 10
Seminars	4	0.16	3, 4, 9, 6, 5, 7, 10
Theory classes	28	1.12	2, 3, 4, 6, 5, 7, 8, 1, 11
Type: Autonomous			
Autonomous learning	60	2.4	2, 3, 4, 9, 6, 7, 8, 1, 11
Collaborative learning	38	1.52	2, 3, 4, 9, 6, 7, 8, 10

Assessment

The subject consists of the following evaluation activities:

- Two partial exams including theory and exercices (45% each exam)

- Delivery of solved exercices (10%).

Non-participation in any of the specific tests will be assessed with a zero.

For a student to pass the subject through continuous assessment it is necessary to obtain a minimum grade of 2 in each of the partial exams plus a weighted grade of 5 in the global of the subject. If this grade is not achevieved, the student may undergo a resit exam only if he/she has been previously evaluated in a set of activities that represent a minimum of two thirds of the total qualification of the subject. In this case, exercices delivering mark remains unchanged.

For each evaluation activity, a place, date and time of revision will be set. There will not be further revision opportunities for students not attending the revision.

Following UAB regulations, students with a grade of 9.0 or higher in a subject may be qualified by an Honors degree. The number of Honors degrees awarded to students cannot be higher than 5% of the total number of students enrolled in a subject.

A student will be considered non-evaluable (NA) if he/she has not undertaken some of the partial exams or the recovery exam.

Without prejudice to other disciplinary measures, and in accordance with current academic regulations, any irregularities committed by the student that could lead to a variation of the score of an evaluation act will be marked with a zero. Therefore, copying or allowing to copy in an evaluation activity will imply a zero (0).

Students coursing the subject for a second or third year must undergo the above listed evaluation activities.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Delivery of solved problems	10%	0	0	2, 3, 4, 9, 6, 11, 10
First exam	45 %	3	0.12	4, 9, 6, 5, 7, 8, 10
Second exam	45%	3	0.12	2, 3, 4, 6, 5, 7, 8, 1, 11

Bibliography

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- Izquierdo J.F. i col. (2011). Introducción a la Ingeniería Química. Problemas resueltos de Balances de Materia y Energía. Editorial Reverté.
- Davis M.L., Cornwell D.A. (1991) "Introduction to Environmental Engineering". McGraw-Hill,
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