UNIVERSIDAD PONTIFICIA ICAI ICADE COMILLAS MADRID
ESCUELA TÉCNICA SUPERIOR DE INGENIERÍA

DIM-IND-421 Environmental Engineering

SEMESTER: Spring

CREDITS: 4.5 ECTS (Theory 3 hrs. per week + Lab 6 hrs total)

LANGUAGE: Spanish

DEGREES: IGITI

Course overview

This course is an introduction to the sustainable development applied to environmental technology. It includes an overview of environmental issues such as air pollution, greenhouse gases, carbon footprint and water pollution; life cycle assessment and environmental management systems. We will study water purification (WPP) and the wastewater treatment plants (WWTP).

Prerequisites

There do not exist prerequisites.

Course contents

Theory:

1. Introduction and basic concepts. The challenges of sustainability. Definitions of sustainability. Interpretations of sustainability. Is sustainability possible? Corporate sustainability.
2. Measurement of sustainability. Indicators of sustainability. Aggregate indicators and individual indicators. Examples of commonly used indicators. Instruments for sustainability. General criteria. Sustainability rules and policies.
3. Environmental impact assessment. Life Cycle Analysis. Cost-benefit analysis. Evaluation of social capital. Sustainability policies.
4. Environmental technology. Air: parts of the atmosphere, pollution measure and control, greenhouse gases, carbon footprint, carbon capture and storage.
5. Environmental technology. Water: hydrology and hydrogeology, quality, purification (WPP) and wastewater treatment plants (WWTP).
6. Environmental technology. Soil: Soil features and pollution. Natural resources management. Solid waste management.

Laboratory:

There will be three 2-hour sessions in the middle of the term.

P1. Raw Water Analysis.
P2. Chlorine procedure and Jar Test.
P3. Waste Water Analysis

Textbook

- Boyle, G. (2012). *Renewable Energy: Power for a Sustainable Future*. 3rd Edition. Oxford University Press.
- Davis, M. L., & Masten, S. J. (2004). *Principles of environmental engineering and science.* McGraw-Hill.
- Henry, J. G., & Heinke, G. W. (1996). *Environmental science and engineering*. 2nd Edition. Prentice Hall.
- Mulder, K. (ed) (2006). *Sustainable development for engineers.* Greenleaf Publishing.
- Rogers, P.P., K.F. Jalal, J.A. Boyd (2007). *Introduction to sustainable development*. Earthscan Publications.

Grading

The following conditions must be accomplished to pass the course:

- A minimum overall grade of at least 5 over 10.
- A minimum grade in the final exam of 4 over 10.

The overall grade is obtained as follows:

- Final exam 60%.
- Other exams 30%. Typically, there is 1 mid-term exam (2-hour long) and 2 additional short exams (1-hour long). They are weighted according to their duration.
- Lab 10%.