33106 - AR - Water as a Resource

Coordinating unit: 330 - EPSEM - Manresa School of Engineering
Teaching unit: 750 - EMIT - Department of Mining, Industrial and ICT Engineering
Academic year: 2019
Degree: MASTER'S DEGREE IN NATURAL RESOURCE ENGINEERING (Syllabus 2015). (Teaching unit Compulsory)
MASTER'S DEGREE IN NATURAL RESOURCE ENGINEERING (Syllabus 2008). (Teaching unit Optional)
MASTER'S DEGREE IN NATURAL RESOURCE ENGINEERING (Syllabus 2009). (Teaching unit Optional)
ECTS credits: 5
Teaching languages: Spanish

Teaching staff
Coordinator: MARIA DOLORS GRAU VILALTA

Degree competences to which the subject contributes

General:
1. The ability to communicate effectively orally and in writing.
2. The ability to summarise and think critically. The ability to adapt to new technologies.

Teaching methodology
The teaching method consists in the professors presenting the topics using the materials that are available on the ATENEA virtual campus. The materials contain a large number of links to web pages belonging to companies and public administrations on the topics. Students must complete the information given in class with the information on these web pages.
Exercises are generally completed in class in small groups and are subject to continuous assessment.
Field trips organised to study real cases are also subject to continuous assessment.

Learning objectives of the subject

1. To present water, one of the natural resources that is most relevant and most current, from a global perspective.
2. To explain various domestic and industrial forms of water treatment, with an emphasis on optimising its use.
3. To introduce students to the study of groundwater.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 45h</th>
<th>Hours large group: 30h</th>
<th>66.67%</th>
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<tr>
<td>Hours medium group: 15h</td>
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**Description:**

1. Water a limited resource - Water on the planet:

2. Characteristics and properties of water:
   Chemical, physical and biological properties of water. Water anomalies. Water quality indexes. Analytical determinations to define the fluvial state.

3. The water cycle:

4. Origin, measurement and management of surface water:

5. Groundwater, hydrogeological behavior, hydrogeochemistry, pollution:

6. Adaptation of water for use: water for human consumption - water for industry:
   Collection of water for urban cities. Water use in industry.

7. Drinking Water Treatments, Drinking Water Treatment Station:
   Parameters of control and analysis of drinking water, legislation. Origin of the water supplied to the cities. Treatment operations: roughing, pre-disinfection, coagulation-flocculation, sedimentation, filtration, disinfection.

8. Water treatment in the industry: Boiler water - Cooling water - Water / Energy binomial:

9. Treatments with membranes:

10. Techniques for optimizing and saving water use:
Qualification system

Face-to-face assessment system:
- Written test (40%)
- Internet research and oral presentation of detailed information on a chosen topic (30%)
- Exercises (20%)
- Visits (10%)

Blended-learning assessment system:
- Written test (40%)
- Internet research and oral presentation of detailed information on a chosen topic (20%)
- Exercises (30%)
- Visits (10%)

Bibliography

Basic:


