Last update: 14-11-2019

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

Generical:

1. The ability to communicate effectively orally and in writing.
2. (ENG) Sintetitzar i raonar críticament. Adaptar-se a les noves tecnologies.

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

Total learning time: 45h	Hours large group:	30h	66.67%
	Hours medium group:	15h	33.33%

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Content

DESCRIPTION	Learning time: 50h Theory classes: 30h Practical classes: 20h

Description:

1. Water: a limited resource. The Earth's water
2. Characteristics and properties of water
3. The water cycle
4. Origin, measurement and management of surface water
5. Groundwater: hydrogeological and hydrogeochemical behaviour, pollution
6. Treating water for human consumption and industry
7. Treatments for obtaining drinking water: drinking water treatment plants
8. Treatments for water in industry: water in boilers and cooling circuits
9. Reverse osmosis treatments
10. Optimisation techniques for water use and saving

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%)

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Bibliography

Basic:

American Water Works Association. Calidad y tratamiento del agua: manual de suministros de agua comunitaria. Madrid: McGraw-Hill, 2002. ISBN 8448132106.

American Water Works Association. Tratamiento del agua por procesos de membrana: principios, procesos y aplicaciones. Madrid: McGraw-Hill, 1998. ISBN 8448112067.

Amjad, Zahid, ed. Reverse osmosis: membrane technology, water chemistry, and industrial applications. New York: Van Nostrand Reinhold, 1993. ISBN 0442239645.

Cheremisinoff, Paul N. Handbook of water and wastewater treatment technology [on line]. New York: Marcel Dekker, 1995 [Consultation: 15/01/2018]. Available on: <https://discovery.upc.edu/iii/encore/record/C__Rb1425902?lang=cat>. ISBN 0824792777.

Hidrogeología: conceptos básicos de hidrología subterránea. Barcelona: Fundación Centro Internacional de Hidrología Subterránea, 2009. ISBN 9788492146918.

Custodio, E.; Llamas, M. R., eds. Hidrología subterránea. 2ª ed. corr. Barcelona: Omega, 2001. ISBN 8428204462.

Water treatment handbook. 7th ed. Malmaison Cedex: Degrémont, 2007. ISBN 9782743009700.

González Fernández, José A., coord. Teoría y práctica de la lucha contra la corrosión. Madrid: Consejo Superior de Investigaciones Científicas. Centro Nacional de Investigaciones Metalúrgicas, 1984. ISBN 8400056701.

Gray, N. F. Calidad del agua potable: problemas y soluciones. Zaragoza: Acribia, 1996. ISBN 8420008214.

Howd, Robert A.; Fan, Anna M., eds. Risk assessment for chemicals in drinking water. Hoboken: John Wiley, 2008. ISBN 9780471723448.

Kawamura, Susumu. Integrated design and operation of water treatment facilities. 2nd ed. New York: Wiley, 2000. ISBN 0471350931.

Martí Deulofeu, José Mª. Stenco water treatment = Tratamientos de aguas = Tractaments d'aigües. 4ª ed. Barcelona: Stenco, 2007.

Metcalf and Eddy. Ingeniería de aguas residuales: tratamiento, vertido y reutilización. 3ª ed. Madrid: McGraw-Hill, 1995. ISBN 8448116070.