820541 - PQAQ - Water Quality Parameters

**Coordinating unit:** 295 - EEBE - Barcelona East School of Engineering  
**Teaching unit:** 713 - EQ - Department of Chemical Engineering  
**Academic year:** 2015  
**Degree:** BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)  
**ECTS credits:** 6  
**Teaching languages:** Catalan, Spanish

### Teaching staff

**Coordinator:** Leopoldo de Miguel Gisbert  
**Others:** Leopoldo de Miguel Gisbert  
Antonio Gámez López

### Prior skills

Knowledge of chemical solutions: acidity and basicity, ionic equilibrium, complexation and solubility equilibria.  
Basic knowledge of analytical chemistry and organic chemistry.  
Basic knowledge of environmental technology.  
Basic knowledge of microbiology.

### Requirements

Analytical Chemistry - Fifth semester.  
Organic Chemistry - Third semester.  
Environmental technologies and sustainability - Fourth semester.  
Biotechnology - sixth semester.

### Degree competences to which the subject contributes

**Specific:**  
1. Understand the basics of analytical chemistry.  
2. Understand mass and energy balances, biotechnology, mass transfer, separation operations, chemical reaction engineering, the design of reactors, and the recovery and processing of raw materials and energy resources.  

**Transversal:**  
3. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 3. Taking social, economic and environmental factors into account in the application of solutions. Undertaking projects that tie in with human development and sustainability.  
4. EFFECTIVE USE OF INFORMATION RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.

### Teaching methodology

The course uses the methodology of direct exposure by 55%. The individual work, group and in the Laboratory occupies in total and on average 25% of the weekly activity and finally the reporting and problem solving has a charge of 20%.

### Learning objectives of the subject

1. Understand the basics of analytical chemistry.  
2. Understand mass and energy balances, biotechnology, mass transfer, separation operations, chemical reaction engineering, the design of reactors, and the recovery and processing of raw materials and energy resources.  
3. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 3. Taking social, economic and environmental factors into account in the application of solutions. Undertaking projects that tie in with human development and sustainability.  
4. EFFECTIVE USE OF INFORMATION RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.
Introduce students to the concept and idea of what is meant by water quality, and the parameters that define it, from the standpoint of both physical, chemical, biological, environmental and taste. In addition, students will learn the techniques and methods used to determine these parameters, mechanisms and operating principles, and know how to develop application exercises that define significantly the analysis of these water quality parameters.

<table>
<thead>
<tr>
<th>Study load</th>
<th>Hours large group:</th>
<th>45h</th>
<th>30.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total learning time: 150h</td>
<td>Hours medium group:</td>
<td>0h</td>
<td>0.00%</td>
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<tr>
<td></td>
<td>Hours small group:</td>
<td>15h</td>
<td>10.00%</td>
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<td></td>
<td>Guided activities:</td>
<td>0h</td>
<td>0.00%</td>
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<tr>
<td></td>
<td>Self study:</td>
<td>90h</td>
<td>60.00%</td>
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<tr>
<td>Chapter</td>
<td>Description</td>
<td>Learning Time</td>
<td>Theory Classes</td>
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<tr>
<td>Chapter 1 - Hydrochemistry. Chemistry of Water</td>
<td>Technical, physicochemical and biological specifications that defined water quality in the case of water systems for specific uses: bathing water, irrigation water, industrial water (specially, supply treated water for steam boilers and water closed cooling circuits).</td>
<td>41h</td>
<td>14h</td>
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<tr>
<td>Chapter 2 - Ecological Quality of Water Resources</td>
<td></td>
<td>25h</td>
<td>7h</td>
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<tr>
<td>Chapter 3 - Drinking Water Quality</td>
<td></td>
<td>26h</td>
<td>7h</td>
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<tr>
<td>Chapter 4 - Quality of Wastewater and Regenerated Water</td>
<td></td>
<td>26h</td>
<td>7h</td>
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<tr>
<td>Chapter 5 - Quality of Water in Other Systems</td>
<td></td>
<td>22h</td>
<td>7h</td>
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<tr>
<td>Chapter 6 - Quality Assurance of Water Analytical Results</td>
<td></td>
<td>10h</td>
<td>3h</td>
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</table>
There will be a partial control theory and control problems and to term. The proposed problems and the practices will also be evaluated, and in recent reports and evaluate the attitude and work in the laboratory.

Both controls and the tasks are performed and presented at preset dates and time frames indicated.

Basic:


Complementary: