295501 - QDA - Aqueous Solution Chemistry

Coordinating unit: 295 - EEBE - Barcelona East School of Engineering
Teaching unit: 713 - EQ - Department of Chemical Engineering
Academic year: 2018
Degree: BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Teaching unit Compulsory)
ECTS credits: 6
Teaching languages: Catalan

Teaching staff
Coordinator: Casas Pons, Ignasi
Others: Farran Marsà, Adriana
Casas Pons, Ignasi

Opening hours
Timetable: It will be said in class the first day and uploaded to ATENEA.

Prior skills
Requirements

Degree competences to which the subject contributes
Specific:
CEQUI-19. 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:
04 COE N3. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 3. Communicating clearly and efficiently in oral and written presentations. Adapting to audiences and communication aims by using suitable strategies and means.
05 TEQ N1. TEAMWORK - Level 1. Working in a team and making positive contributions once the aims and group and individual responsibilities have been defined. Reaching joint decisions on the strategy to be followed.
06 URI N3. 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 consists of classes in which teacher presents the learning objectives related to the contents that are subsequently applied in solving practical examples. Enhancing the active participation of students in solving practical cases, proposing a number of numerical problems and proposals motivated by cases coming to reality related to the field of chemistry. Also lab experiences are performed where students can work on practical experiences where they apply the knowledge acquired in the theory and problems classes.

Learning objectives of the subject
The overall objective of the course is to establish the chemical bases necessary to interpret the most important chemical reactions that take place in aqueous solution and are applied in the field of Chemical Industry and the Environment.

At the end of the course students should be able to:
1. Predict the reactivity and stability of inorganic chemicals common
2. Write correctly differentiating the chemical reactions that are in chemical equilibrium.
3. Using the equations corresponding to the mass balance and electric charge as well as the constant need to interpret thermodynamic chemical equilibrium.
4. Calculate the concentrations of the different species in aqueous solution in equilibrium reactions: acid-base, complexation, solubility and oxidation-reduction.
5. Apply the calculation examples of systems in equilibrium in the environment and the chemical industry.
6. Use proper equipment and basic instrumentation of a chemical laboratory, conducting experiments during the course contents.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group:</th>
<th>45h</th>
<th>30.00%</th>
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<tbody>
<tr>
<td></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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<tr>
<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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</table>

Content

<table>
<thead>
<tr>
<th>Tema 1</th>
<th>Learning time: 1h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 1h</td>
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</tbody>
</table>

Description:
Tema 1

Qualification system

The lab score is based on the reports submitted at the end of each practice session. Also, it is required to deliver at the beginning of each practice a report. The final practice (NP) will be obtained as the average of the different lab sessions and will constitute 15% of the final grade for the course. Failure to attend any practice without just cause or not having done previous work, the grade for the session will be zero.

The partial tests (AC) made during the course constitute 25% of the final grade.

The remaining 60% will be obtained in the final exam (EF).

So: FINAL GRADE = 0.15*NP + 0.25*AC + 0.6*EF

There will be a re-evaluation test, that will substitute the final test, having the same weight on the final grade.
Regulations for carrying out activities

Previous work to be presented at the beginning of the lab session as well as the script for the same will be given throughout the course, before each session. Calculator is the only tool to be used in written tests. The partial tests do not eliminate the matter.

Bibliography

Others resources: