

## 230453 - QI - Inorganic Chemistry

Coordinating unit: 230 - ETSETB - Barcelona School of Telecommunications Engineering  
Teaching unit: 713 - EQ - Department of Chemical Engineering  
Academic year: 2017  
Degree: BACHELOR'S DEGREE IN ENGINEERING PHYSICS (Syllabus 2011). (Teaching unit Compulsory)  
ECTS credits: 6 Teaching languages: Catalan, Spanish

### Teaching staff

Coordinator: Iribarren Laco, Jose Ignacio  
Others: Urpi Garriga, Lourdes

### Degree competences to which the subject contributes

#### Specific:

1. Knowledge of the chemistry laws. Knowledge of the main chemical methods of producing materials and nanomaterials. Ability to conduct and analyze basic chemical reactions.

#### Generical:

4. ABILITY TO IDENTIFY, FORMULATE, AND SOLVE PHYSICAL ENGINEERING PROBLEMS. Planning and solving physical engineering problems with initiative, making decisions and with creativity. Developing methods of analysis and problem solving in a systematic and creative way.

#### Transversal:

2. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 1. Planning oral communication, answering questions properly and writing straightforward texts that are spelt correctly and are grammatically coherent.

3. SELF-DIRECTED LEARNING - Level 1. Completing set tasks within established deadlines. Working with recommended information sources according to the guidelines set by lecturers.

1. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 1. Analyzing the world's situation critically and systemically, while taking an interdisciplinary approach to sustainability and adhering to the principles of sustainable human development. Recognizing the social and environmental implications of a particular professional activity.

### Teaching methodology

Inside class: 2,6 ECTS. Seminal classes (theory + seminars) with the participation of the student. Homework (individual and/or team). Tutorial.

Outside class: 3,4 ECTS. Exercises and projects (theory or seminars).

### Learning objectives of the subject

- Understand and apply the basic concepts of Chemistry related to the atomic and molecular structure and the properties of matter.
- Apply the principles of chemical transformations to the knowledge and calculation of transformed reactants and products obtained.
- Justify the applications of common inorganic compounds.

## 230453 - QI - Inorganic Chemistry

### Study load

Total learning time: 150h	Hours large group:	65h	43.33%
	Self study:	85h	56.67%

## 230453 - QI - Inorganic Chemistry

### Content

<p>Utility of the periodic table</p>	<p>Learning time: 28h Theory classes: 12h Guided activities: 4h Self study : 12h</p>
<p>Description: Organization of the periodic table. Periodic properties. Periodicity and physical and structural properties. Relationships between structure and properties.</p>	
<p>The covalent bond</p>	<p>Learning time: 20h Theory classes: 10h Self study : 10h</p>
<p>Description: The Lewis theory. Electron pair repulsion and structure. Hibridation and structure. Molecular orbitals. Intermolecular forces. Solids.</p>	
<p>The metallic bond</p>	<p>Learning time: 16h Theory classes: 8h Self study : 8h</p>
<p>Description: Bonding models. Cell unit, reticular point and motif. Packing factor and crystal density. Types of structures. Alloys. Properties of metals and alloys.</p>	
<p>The ionic bond</p>	<p>Learning time: 10h Theory classes: 5h Self study : 5h</p>
<p>Description: Characteristics of ionic compounds. Crystal structure of ionic compounds. The Born-Haber cycle. Periodic trends and bond formation.</p>	

## 230453 - QI - Inorganic Chemistry

Chemical reactions	Learning time: 24h Theory classes: 8h Guided activities: 8h Self study : 8h
Description: Introduction to inorganic reactions. Types of reactions. Simple reactions kinetics. Influence of temperature. Reaction mechanisms. Thermodynamic factors and kinetic factors.	
Acids and bases	Learning time: 20h Theory classes: 8h Guided activities: 4h Self study : 8h
Description: Acids and bases of Brønsted-Lowry. The pH scale. pH calculation by means of matter and charge balances. Diagrams logc-pH. Acids and bases of Lewis.	
Oxidation and reduction	Learning time: 20h Theory classes: 8h Guided activities: 4h Self study : 8h
Description: Oxidation number and formal oxidation state. Periodic trends. Redox processes. Latimer, Frost, Pourbaix. Corrosion. Electrolysis.	
Organometallic compounds	Learning time: 12h Theory classes: 6h Self study : 6h
Description: The organometallic bond. Types of organometallic compounds.	

### Qualification system

Qualification will include a final exam (EF) and continuous evaluation including a mid-semester exam (EP) and the participation of the student in seminar classes (P). The final qualification will be calculated as follows:  $\max\{EF, 0.65*EF + 0.30*EP + 0.05*P\}$

## 230453 - QI - Inorganic Chemistry

### Bibliography

#### Basic:

Rayner-Canham, G.W. Química inorgánica descriptiva. 2a ed. México: Addison Wesley Longman, 2000. ISBN 9789684443853.

Puddephatt, R.J.; Monaghan, P.K. The periodic table of the elements. 2nd ed. New York: Oxford University Press, 1986. ISBN 978-0198555162.

#### Complementary:

Rochow, E.G. Química inorgánica descriptiva. Barcelona: Reverté, 1981. ISBN 8429174842.

Shriver, D.F.; Atkins, P.W.; Langford, C.H. Química inorgánica. Barcelona: Reverté, 1998. ISBN 8429170065.