Curriculum - Academic Year 2018-19
Characteristics of the Course Units

Name	*Electrochemistry*
ECTS credits	*3*
Year / Semester	*I /1°*
Specific learning outcomes	*On successful completion of this module students should be able to:* *1 – Use the terminology of electrochemistry (terms such as cell, electrode, cathode anode)* *2 – Use Faraday's Law of Electrolysis to calculate amounts of products formed, amounts of current passed, time elapsed* *3- Recognize the electric mobility of ions, measure of transport number, and calculate the mobility* *4 – Recognize the difference between Galvanic cell and Electrolytic cell* *5 – Describe the construction of a voltaic cells from half-cells* *6 – Use the Nernst equation to relate electrode potentials and cell potentials to different concentrations* *7 – Recognize the current-potential relationship*
Contents	*Oxidization and reduction; Migration and transportation; Metallic conductor or of 1st kind; Electrolytic conductor or 2nd species; Electrolysis; Law of Faraday; Electric mobility of ions; Number of transportation; Measure of numbers of transportation by the method of Hittorf; Measure of transport numbers by displacement of limit; Conductance; Measure of the conductance; Equivalent conductivity; Formula of Kohlraush; Strong electrolyte; Weak electrolyte; Law of additivity of Kohlraush; Conductometry titration; Calculation of mobilities; Theory of Debye and Huckel; Electromotive force; Cell diagram; The Daniell cell; Calculation of the dissociation constant; Influence of the temperature on the e.m.f of a galvanic cell; Potential of electrode (formula of Nernst); Different types of electrodes; Scale of potentials; Measure of the mean activity coefficient; Measure of the pH; Calculation of the solubility product; Elements of thermodynamics; Elements of kinetics; Theory of the activated complex; Equation of Butler-Volmer; Law of Tafel.*
Teaching and learning methods	
Teaching techniques	
Assessment methods	*Written.* *A two mid-term written test and a final-term written test are foreseen.* *The first mid-term written test will be devoted to the assessment of the level of achievement of LOs 1, 2 and 3.* *The second mid-term written test will be devoted to the assessment of the level of achievement of LOs 4, 5, 6 and 7.* *The final term written test will be devoted to the assessment of the level of achievement of LOs 1,2,3,4, 5, 6 and 7.*
Assessment criteria	*In the mid-term test students should demonstrate their ability to identify the anodic and the cathodic reaction and to calculate amounts of products formed. The student will be able to calculate transport numbers, conductivity and mobility of ions.* *In the second mid-term test students will be able to write half reactions, identify the cathode, the anode in a standard cell, calculate the potential of electrodes, and relate*

	the current to the potential of the electrode.
Assessment metrics	*Attribution of a final grade*
Criteria of attribution of the final grade	*The grade goes from 1 (minimum) up to 20 (maximum). The minimum threshold to pass is 7. To pass the exam students should obtain the minimum evaluation in all the assessments.* *The final grade will be determined according to the following rules:* - *Mid-terms written test: 20%* - *Practical classes assessments: 30%* - *Final examination (including): 50%*
Preparatory course units	
Didactic material	*J. Bard "Electrochemical methods. Fundamentals and applications"* *Mortimer "Physical chemistry"*