



## IDENTIFYING DATA

### Bioelectrochemistry

Subject	Bioelectrochemistry			
Code	V12G350V01921			
Study programme	Degree in Industrial Chemical Engineering			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4th	1st
Teaching language	Galician			
Department				
Coordinator	Nóvoa Rodríguez, Ramón			
Lecturers	Nóvoa Rodríguez, Ramón			
E-mail	rnovoa@uvigo.es			
Web	<a href="http://faitic.uvigo.es/">http://faitic.uvigo.es/</a>			
General description	(*)In this subject it is intended to introduce students to the discipline of electrochemistry, its fundamentals and applications, with particular emphasis on industrial and biotechnological applications.			

## Competencies

Code	
B3	CG3 Knowledge in basic and technological subjects that will enable students to learn new methods and theories, and provide them the versatility to adapt to new situations.
B4	CG4 Ability to solve problems with initiative, decision making, creativity, critical thinking and the ability to communicate and transmit knowledge and skills in the field of industrial engineering specializing in Industrial Chemistry.
C16	CE16 Basic knowledge and application of environmental technologies and sustainability.
C19	E19 Knowledge of mass and energy balances, biotechnology, mass transfer, separation operations, chemical reaction engineering, reactor design, and recovery and processing of raw materials and energy resources.
D1	CT1 Analysis and synthesis.
D2	CT2 Problems resolution.
D3	CT3 Oral and written proficiency in the own language.
D9	CT9 Apply knowledge.
D10	CT10 Self learning and work.
D16	CT16 Critical thinking.
D17	CT17 Working as a team.

## Learning outcomes

Expected results from this subject	Training and Learning Results		
Know the basic appearances of the electrochemical reactions applied to biotechnological systems.	B3 B4	C19	D2 D3 D10 D16 D17
Apply the basic concepts of bioelectrochemistry to removing contaminants , bioenergy, bio-corrosion , etc.	B4	C16	D1 D3 D9 D16 D17

## Contents

Topic
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Electrolytes and interfaces	Electrode potential Structure of interfaces Electrochemical kinetics Mass transport
Methods of study	Electrochemical instrumentation Electrodes DC methods AC methods
Sensors	Potentiometric (including enzymatic selectivity). Amperometric
Industrial electrochemistry	Electrolysis Syntheses Batteries Fuel cells (including those bio-based)
Corrosion	Fundamentals Protection methods
Bioelectrochemistry	Interfaces between biomolecules Bio-energy Bio-catalysis

### Planning

	Class hours	Hours outside the classroom	Total hours
Master Session	32.5	65	97.5
Laboratory practises	9	13.5	22.5
Troubleshooting and / or exercises	9	13.5	22.5
Troubleshooting and / or exercises	2	0	2
Short answer tests	2	0	2
Reports / memories of practice	0.5	3	3.5

\*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

### Methodologies

	Description
Master Session	Presentation of the subject with audiovisual support
Laboratory practises	Practical works synchronised with the master classes. Work on experimental techniques and practical cases.
Troubleshooting and / or exercises	Resolution of exercises enabling to fix the concepts of theory and confront the laboratory work with guarantee of success.

### Personalized attention

Methodologies	Description
Troubleshooting and / or exercises	The resolution of exercises and practices will have individualized assistance to students.
Laboratory practises	The resolution of exercises and practices will have individualized assistance to students.

### Assessment

	Description	Qualification	Training and Learning Results
Master Session	Examination with short questions	40	B3 C16 D1 D3 D9 D10
Laboratory practises	Work in the laboratory and report of activity	30	B4 D1 D3 D9 D16 D17
Troubleshooting and / or exercises	Examination with exercises related with the theory	30	B4 C16 C19 D1 D2 D3 D9 D10 D16

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**Other comments on the Evaluation**

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Ethical commitment:

The student is expected to have an adequate ethical behaviour. In the case of unethical behavior (copying, plagiarism, unauthorized use of electronic devices, etc.) will be considered as not fulfilling the requirements to pass the subject. In which case the overall rating in the current academic year will be FAIL (0.0 points).

The use of unauthorised electronic devices is not allowed. Introducing unauthorised electronic devices in the examination room will be considered reason FAIL the subject in the current academic year and will hold overall rating of 0.0 points.

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**Sources of information**

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C.M.A. Brett, A.M. Oliveira-Brett, **Electrochemistry : principles, methods and applications**, Oxford University Press,  
A. J. Bard, **Electrochemical methods : fundamentals and applications**, J. Wiley,

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**Recommendations**

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**Subjects that it is recommended to have taken before**

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Chemistry: Chemistry/V12G350V01205

Materials Science and Technology/V12G350V01305

Chemical Engineering I/V12G350V01405

Electronic Technology/V12G350V01402

Chemical Engineering II/V12G350V01503

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**Other comments**

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Requirements:

To enroll in this subject it is necessary to have passed all the subjects of the courses below or be enrolled in matters not overcome.

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