



## (\*Facultade de Química

### Presentation

The studies of Chemistry have a large tradition at the University of Vigo, where it has been taught during more than 30 years. The establishment of the University System of Galicia in the 90s and the current process of implantation of the European Space of Higher Education (EEES) modified the offer of degrees, but not the pioneering spirit of the chemists in research or in the quest for a better service to the society.



### Degrees given in the Faculty

Degree in Chemistry

- Masters And Doctorates:
  - Industry and Chemical Research and Industrial Chemistry
  - Theoretical chemistry and Computational Modelling
- Master:
  - Science and Technology of Conservation of Fishing Products

### Web page

Information about the Faculty of Chemistry:

<http://quimica.uvigo.es>

## Máster Universitario en Investigación Química y Química Industrial

### Subjects

#### Year 1st

Code	Name	Quadmester	Total Cr.
V11M162V02103	Advanced Structural Determination	1st	3
V11M162V02104	Industrial Processes and Sustainability	1st	3
V11M162V02107	Supramolecular Chemistry	2nd	3
V11M162V02110	Applied Coordination Chemistry	1st	3
V11M162V02111	Organometallic Chemistry	1st	3

V11M162V02112	Synthetic Applications of Organometallic Compounds	2nd	3
V11M162V02113	Stereoselective Synthesis	1st	3
V11M162V02115	Chemistry of Biomolecules	1st	3
V11M162V02116	Metals in Biological Processes	1st	3
V11M162V02117	Medicinal Chemistry	2nd	3
V11M162V02119	The Chemistry of Natural Products	2nd	3
V11M162V02120	Preparation of Nanomaterials	1st	3
V11M162V02121	Advanced Techniques for the Characterization of Materials	2nd	3
V11M162V02122	Properties of Materials	1st	3
V11M162V02128	Chromatography and Analytical Separation	2nd	3
V11M162V02129	Industrial Chemistry: Process control	2nd	3
V11M162V02130	Quality in the Chemistry Laboratory	1st	3
V11M162V02131	Industrial Safety	1st	3
V11M162V02132	Management in Chemical Industry	1st	3
V11M162V02133	Industrial Legislation	2nd	3
V11M162V02134	Economics and Industry	1st	3
V11M162V02135	Human Resources	1st	3
V11M162V02138	Project Management	1st	3
V11M162V02140	Validation of analytical methodologies	1st	3
V11M162V02141	Characterisation of materials and biointerfaces	1st	3
V11M162V02142	Scientific transfer and communication	1st	3
V11M162V02143		1st	3
V11M162V02144		2nd	3
V11M162V02145		2nd	3
V11M162V02146		1st	3
V11M162V02147		1st	3
V11M162V02148	Initiation to research	An	6
V11M162V02149	Clinical and methodological analyzes	1st	3
V11M162V02150	Polymeric molecular materials	1st	3
V11M162V02151		2nd	3
V11M162V02152		1st	3
V11M162V02153		1st	3
V11M162V02154		2nd	3
V11M162V02155		1st	3
V11M162V02156	Final Dissertation	2nd	24

<b>IDENTIFYING DATA</b>				
<b>Advanced Structural Determination</b>				
Subject	Advanced Structural Determination			
Code	V11M162V02103			
Study programme	Máster Universitario en Investigación Química y Química Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Mandatory	1st	1st
Teaching language	Spanish Galician			
Department				
Coordinator	Muñoz López, Luis			
Lecturers	Muñoz López, Luis Talavera Nevado, María			
E-mail	lmunoz@uvigo.es			
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>			
General description	The subject guide is available at the following link <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/advanced-strutural-determination-17767-17013-2-95796">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/advanced-strutural-determination-17767-17013-2-95796</a>			

### Training and Learning Results

Code

### Expected results from this subject

Expected results from this subject

Training and Learning Results

New

### Contents

Topic

### Planning

Class hours	Hours outside the classroom	Total hours
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\*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

### Methodologies

Description

### Personalized assistance

### Assessment

Description	Qualification	Training and Learning Results
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### Other comments on the Evaluation

### Sources of information

#### Basic Bibliography

#### Complementary Bibliography

### Recommendations

**IDENTIFYING DATA****Industrial Processes and Sustainability**

Subject	Industrial Processes and Sustainability			
Code	V11M162V02104			
Study programme	Máster Universitario en Investigación Química y Química Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Mandatory	1st	1st
Teaching language	Spanish			
Department				
Coordinator	Souto Salgado, José Antonio			
Lecturers	Novoa Carballal, Ramón Souto Salgado, José Antonio			
E-mail	souto@uvigo.es			
Web	<a href="http://http://quimica.uvigo.es/es/estudios/master-iqqi/">http://http://quimica.uvigo.es/es/estudios/master-iqqi/</a>			
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/industrial-processes-and-sustainability-17767-17013-2-95797">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/industrial-processes-and-sustainability-17767-17013-2-95797</a>			

**Training and Learning Results**

Code

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Topic

**Planning**

Class hours	Hours outside the classroom	Total hours
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\*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

**Methodologies**

Description

**Personalized assistance****Assessment**

Description	Qualification	Training and Learning Results
-------------	---------------	-------------------------------

**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****Supramolecular Chemistry**

Subject Supramolecular Chemistry

Code V11M162V02107

Study Máster Universitario en  
programme Investigación Química y  
Química Industrial

Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	2nd

Teaching Spanish

language Galician

Department

Coordinator Cid Fernández, María Magdalena

Lecturers Cid Fernández, María Magdalena  
Valencia Matarranz, Laura María

E-mail mcid@uvigo.es

Web <http://http://miqqi.webs.uvigo.es/gl/>

General description The subject guide is available at the following link:

<https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/2023-2024/supramolecular-chemistry-op-17769-17015-3-91602>**Training and Learning Results**

Code

**Expected results from this subject**

Expected results from this subject

Training and  
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Topic

**Planning**

Class hours

Hours outside the  
classroom

Total hours

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

**Methodologies**

Description

**Personalized assistance****Assessment**

Description

Qualification

Training and Learning Results

**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****Applied Coordination Chemistry**

Subject	Applied Coordination Chemistry			
Code	V11M162V02110			
Study programme	Máster Universitario en Investigación Química y Química Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	1st
Teaching language	Spanish Galician			
Department				
Coordinator	Vázquez López, Ezequiel Manuel Pérez Lourido, Paulo Antonio			
Lecturers	Pérez Lourido, Paulo Antonio Vázquez López, Ezequiel Manuel			
E-mail	ezequiel@uvigo.es paulo@uvigo.es			
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>			
General description	The subject guide is available at the following link:  <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/applied-coordination-chemistry-17769-17015-3-95799">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/applied-coordination-chemistry-17769-17015-3-95799</a>			

**Training and Learning Results**

Code	
<b>Expected results from this subject</b>	
Expected results from this subject	Training and Learning Results

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**Planning**

	Class hours	Hours outside the classroom	Total hours
*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.			

**Methodologies**

Description	
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**Personalized assistance****Assessment**

Description	Qualification	Training and Learning Results
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**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****Organometallic Chemistry**

Subject Organometallic Chemistry

Code V11M162V02111

Study Máster Universitario en  
programme Investigación Química y  
Química Industrial

Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	1st

Teaching Spanish  
language

Department

Coordinator García Fontán, María Soledad  
Bolaño García, SandraLecturers Bolaño García, Sandra  
García Fontán, María Soledad  
Talavera Nevado, MaríaE-mail sgarcia@uvigo.es  
bgs@uvigo.esWeb <http://http://miqqi.webs.uvigo.es/gl/>General The subject guide is available at the following link:  
description<https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/2023-2024/organometallic-chemistry-17769-17015-3-95800>**Training and Learning Results**

Code

**Expected results from this subject**

Expected results from this subject

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Learning Results**Contents**

Topic

**Planning**

Class hours

Hours outside the  
classroom

Total hours

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

**Methodologies**

Description

**Personalized assistance****Assessment**

Description

Qualification

Training and Learning Results

**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****Synthetic Applications of Organometallic Compounds**

Subject	Synthetic Applications of Organometallic Compounds		
Code	V11M162V02112		
Study programme	Máster Universitario en Investigación Química y Química Industrial		
Descriptors	ECTS Credits	Choose	Year
	3	Optional	1st
Teaching language	Spanish		Quadmester
	Galician		2nd
Department			
Coordinator	Álvarez Rodríguez, Rosana		
Lecturers	Álvarez Rodríguez, Rosana Martínez Fernández, Claudio		
E-mail	rar@uvigo.es		
Web	<a href="http://http://miqqi.webs.uvigo.es/es/">http://http://miqqi.webs.uvigo.es/es/</a>		
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/synthetic-applications-organometallic-compounds-17769-17015-3-95801">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/synthetic-applications-organometallic-compounds-17769-17015-3-95801</a>		

**Training and Learning Results**

Code	
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**Expected results from this subject**

Expected results from this subject	Training and Learning Results
New	
New	
New	

**Contents**

Topic
(*)1. Reacciones de acoplamiento cruzado e reacción de Heck
(*)2. Reacciones de inserción
(*)3. Reacciones de complejos pi3-alilo
(*)4. Reacciones de complejos metálicos de alquenos, alquinos, dienos e arenas
(*)5. Reactividade dos carbenos metálicos
(*)6. Reacciones de activación de enlaces CH.

**Planning**

	Class hours	Hours outside the classroom	Total hours
Seminars	11	21	32
Lecturing	10	21	31
Problem and/or exercise solving	2	10	12

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**Methodologies**

	Description
Seminars	(*)Realizaranse exercicios de cada tema, ben empregando o encerado o ben de maneira individual
Lecturing	(*)Empregarase material adiantado aos alumnos para introducir as reaccións de cada tema. Empregarase tamén o encerado

**Personalized assistance**

Methodologies	Description
Lecturing	
Seminars	
Tests	Description



Problem and/or exercise solving

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**Assessment**

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	Description	Qualification	Training and Learning Results
Seminars	(*)Durante as sesións do seminario, proporase aos alumnos unha serie de problemas adicionais que terán que ser entregados na data acordada	20	
Problem and/or exercise solving	(*)Ao final da materia haberá unha proba escrita de 2-3 horas.	80	

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**Other comments on the Evaluation**

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**Sources of information**

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**Basic Bibliography**

Bates, R., **Organic Synthesis Using Transition Metals**, 2nd, wiley, 2012

Hegedus, L. S., **Transition Metals in the Synthesis of Complex Organic Molecules**, 2nd, University Science Books, 1999

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**Complementary Bibliography**

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**Recommendations**

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

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Applied Coordination Chemistry/V11M162V02110

Organometallic Chemistry/V11M162V02111

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**IDENTIFYING DATA****Stereoselective Synthesis**

Subject Stereoselective Synthesis

Code V11M162V02113

Study Máster Universitario en  
programme Investigación Química y  
Química IndustrialDescriptors ECTS Credits  
3Choose  
OptionalYear  
1stQuadmester  
1stTeaching Spanish  
language

Department

Coordinator Rodríguez de Lera, Angel

Lecturers Rodríguez de Lera, Angel  
Vaz Araújo, Belén

E-mail qolera@uvigo.es

Web <http://http://miqqi.webs.uvigo.es/es/>General The subject guide is available at the following link:  
description<https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/2023-2024/stereoselective-synthesis-op-17769-17015-3-91607>**Training and Learning Results**

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**Expected results from this subject**

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**Planning**

Class hours

Hours outside the  
classroom

Total hours

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**Methodologies**

Description

**Personalized assistance****Assessment**

Description

Qualification

Training and Learning Results

**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****Chemistry of Biomolecules**

Subject Chemistry of Biomolecules

Code V11M162V02115

Study Máster Universitario en  
programme Investigación Química y  
Química Industrial

Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	1st

Teaching Spanish  
language

Department

Coordinator Teijeira Bautista, Marta

Lecturers García Domínguez, Patricia  
Teijeira Bautista, Marta

E-mail qomaca@uvigo.es

Web <http://http://miqqi.webs.uvigo.es/gl/>General (\*)The subject guide is available at the following link:  
description<https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/2023-2024/biomolecul-chemistry-op-17770-17016-3-91609>**Training and Learning Results**

Code

**Expected results from this subject**

Expected results from this subject

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Topic

**Planning**

Class hours

Hours outside the  
classroom

Total hours

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**Methodologies**

Description

**Personalized assistance****Assessment**

Description

Qualification

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**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****Metals in Biological Processes**

Subject	Metals in Biological Processes			
Code	V11M162V02116			
Study programme	Máster Universitario en Investigación Química y Química Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	1st
Teaching language	Spanish Galician			
Department				
Coordinator	Vázquez López, Ezequiel Manuel Couce Fortúnez, María Delfina			
Lecturers	Couce Fortúnez, María Delfina Vázquez López, Ezequiel Manuel			
E-mail	delfina@uvigo.es ezequiel@uvigo.es			
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>			
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/2023-2024/metals-biological-processes-17770-17016-3-98949">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/2023-2024/metals-biological-processes-17770-17016-3-98949</a>			

**Training and Learning Results**

Code	
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**Expected results from this subject**

Expected results from this subject	Training and Learning Results
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**Planning**

	Class hours	Hours outside the classroom	Total hours
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**Methodologies**

Description	
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**Personalized assistance****Assessment**

Description	Qualification	Training and Learning Results
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**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****Medicinal Chemistry**

Subject	Medicinal Chemistry			
Code	V11M162V02117			
Study programme	Máster Universitario en Investigación Química y Química Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	2nd
Teaching language	Spanish			
Department				
Coordinator	Terán Moldes, María del Carmen Teijeira Bautista, Marta			
Lecturers	Teijeira Bautista, Marta Terán Moldes, María del Carmen			
E-mail	qomaca@uvigo.es mcteran@uvigo.es			
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>			
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/2023-2024/medical-chemistry-op-17770-17016-3-91610">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/2023-2024/medical-chemistry-op-17770-17016-3-91610</a>			

**Training and Learning Results**

Code	
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**Expected results from this subject**

Expected results from this subject	Training and Learning Results
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**Contents**

Topic	
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**Planning**

	Class hours	Hours outside the classroom	Total hours
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**Methodologies**

Description
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**Personalized assistance****Assessment**

Description	Qualification	Training and Learning Results
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**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****The Chemistry of Natural Products**

Subject	The Chemistry of Natural Products			
Code	V11M162V02119			
Study programme	Máster Universitario en Investigación Química y Química Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	2nd
Teaching language	Spanish			
Department				
Coordinator	Besada Pereira, Pedro			
Lecturers	Besada Pereira, Pedro Lorenzo Fernández, Paula			
E-mail	pbes@uvigo.es			
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>			
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/2023-2024/chemistry-natural-products-17770-17016-3-92896">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/2023-2024/chemistry-natural-products-17770-17016-3-92896</a>			

**Training and Learning Results**

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**Expected results from this subject**

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Class hours	Hours outside the classroom	Total hours
-------------	-----------------------------	-------------

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**Methodologies**

Description

**Personalized assistance****Assessment**

Description	Qualification	Training and Learning Results
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**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****Preparation of Nanomaterials**

Subject	Preparation of Nanomaterials			
Code	V11M162V02120			
Study programme	Máster Universitario en Investigación Química y Química Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	1st
Teaching language	Spanish			
Department				
Coordinator	Pérez Juste, Jorge Correa Duarte, Miguel Ángel			
Lecturers	Correa Duarte, Miguel Ángel Pérez Juste, Jorge			
E-mail	macorrea@uvigo.es juste@uvigo.es			
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>			
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/2023-2024/preparation-nanomaterials-17771-17017-3-95804">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/2023-2024/preparation-nanomaterials-17771-17017-3-95804</a>			

**Training and Learning Results**

Code

**Expected results from this subject**

Expected results from this subject Training and Learning Results

New

**Contents**

Topic

**Planning**

	Class hours	Hours outside the classroom	Total hours
Lecturing	0	0	0
Seminars	0	0	0

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

**Methodologies**

Description

Lecturing  
Seminars**Personalized assistance****Assessment**

Description Qualification Training and Learning Results

**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****Advanced Techniques for the Characterization of Materials**

Subject	Advanced Techniques for the Characterization of Materials			
Code	V11M162V02121			
Study programme	Máster Universitario en Investigación Química y Química Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	2nd
Teaching language	Spanish			
Department				
Coordinator	Pérez Juste, Jorge Correa Duarte, Miguel Ángel			
Lecturers	Correa Duarte, Miguel Ángel Pérez Juste, Jorge Rivas Murias, Beatriz			
E-mail	macorrea@uvigo.es juste@uvigo.es			
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>			
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/advanced-materials-characterization-techniques-17771-17017-3-98951">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/advanced-materials-characterization-techniques-17771-17017-3-98951</a>			

**Training and Learning Results**

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**Planning**

Class hours	Hours outside the classroom	Total hours
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**Methodologies**

Description

**Personalized assistance****Assessment**

Description	Qualification	Training and Learning Results
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**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**



**IDENTIFYING DATA****Properties of Materials**

Subject	Properties of Materials			
Code	V11M162V02122			
Study programme	Máster Universitario en Investigación Química y Química Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	1st
Teaching language	#EnglishFriendly Spanish Galician			
Department				
Coordinator	Salgueiriño Maceira, Verónica Pastoriza Santos, Isabel			
Lecturers	Núñez Sánchez, Sara Pastoriza Santos, Isabel Rivas Murias, Beatriz Salgueiriño Maceira, Verónica Vázquez Besteiro, Lucas			
E-mail	vsalgue@uvigo.es pastoriza@uvigo.es			
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>			
General description	(*)The teaching guide for this subject will be available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/2023-2024/material-properties-op-17771-17017-3-91614">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/2023-2024/material-properties-op-17771-17017-3-91614</a>			

**Training and Learning Results**

Code

**Expected results from this subject**

Expected results from this subject	Training and Learning Results
New	
New	
New	
New	
New	
New	
New	

**Contents**

Topic	
(*)TEMA 1. Modelos clásicos e cuánticos de electróns libres: o modelo de Drude e o modelo de Sommerfeld. Efecto do potencial periódico da rede nas propiedades do gas de electróns.	(*)Neste primeiro tema introdúcese as aproximacións para obter a conductividade eléctrica, térmica e o efecto Hall nun gas de electróns libres. A continuación descríbese o efecto da cuantización da enerxía e o principio de exclusión de Pauli sobre a estatística electrónica e as propiedades do modelo de electróns libres: o modelo de Sommerfeld. A calor específica, e a conductividade eléctrica. Descríbense os inconvenientes dos modelos de electróns libres e a necesidade de ter en conta a interacción dos electróns co potencial periódico da rede cristalina para describir sistemas reais. A continuación explícanse as zonas de Brillouin, o teorema de Bloch e fórmulase unha teoría de bandas para electróns libres. Densidade de estados electrónicos. Para rematar demóstrase como a aparición de gaps de enerxía prohibida nas bandas de estados electrónicos son unha consecuencia da interacción con ese potencial periódico.
(*)TEMA 2. Cuantización da enerxía de rede: fonones Neste tema explícase a cuantización da enerxía de rede e calcúlase a relación de dispersión para unha rede monoatómica unidimensional na aproximación do oscilador armónico (velocidade do son e conductividade térmica).	(*)Introdúcese o efecto de romper a simetría (dous átomos distintos, máis dunha dimensión, etc) sobre a relación de dispersión: modos ópticos e acústicos. Introdúcese o modelo de Debye para a conductividade térmica e a expansión térmica.

(\*)TEMA 3. Técnicas experimentais na determinación de propiedades de transporte eléctrico e térmico.

(\*)Explicaranse os aspectos fundamentais das principais técnicas experimentais na determinación de propiedades de transporte eléctrico e térmico en sólidos: conductividade eléctrica, conductividade térmica, poder termoeléctrico e efecto Hall.

(\*)TEMA 4. Fenómenos cooperativos en aislantes: Ferroelectricidad e Magnetismo localizado.

(\*)Introdúcense os fenómenos de polarización e o concepto de constante dieléctrica. Farase un tratamento xeral deste fenómeno para que os estudantes comprendan a relación no tratamento de fenómenos similares como a susceptibilidade magnética. Ecuación de Clausius- Mossotti e ecuación de Debye ( dipolos inducidos e permanentes). Orixe dos materiais ferroeléctricos e o seu fenomenología. Efecto do tamaño do sistema sobre a ferroelectricidad. A orixe do momento magnético e os distintos tipos de resposta a un campo aplicado. A función de Brillouin. Interacción de intercambio e a orixe da magnetización espontánea: Ferromagnetismo. Efecto da enerxía magnetostática sobre a enerxía total do sistema e a formación de dominios magnéticos. Sistemas monodominio e fenomenología de sistemas magnéticos nanoestructurados.

(\*)TEMA 5. Propiedades ópticas de materiais: aspectos xerais. Propiedades ópticas de metais e semiconductores.

(\*)Plasmones: excitacións do gas de electróns libres. Cálculo da frecuencia de resonancia de plasma nun metal. Plasmones masivos, superficiales e localizados. Teoría de Mie e teoría de Gans. Métodos numéricos. Efecto da redución da dimensionalidade sobre as propiedades ópticas. Band gaps directos e indirectos. Excitones. Puntos cuánticos ( nanopartículas) etc.

## Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	9	10	19
Seminars	8	30	38
Laboratory practical	6	8	14
Objective questions exam	1	3	4

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

## Methodologies

	Description
Lecturing	(*)As clases de teoría se impartirán en pizarra con apoio en power point.
Seminars	(*)Se impartirán clases de seminario e tutorías para resolución de problemas concretos ou exposición de traballos por parte do alumno
Laboratory practical	(*)Se impartirán nos laboratorios e se realizarán experimentos por parte dos alumnos.

## Personalized assistance

Methodologies	Description
Lecturing	
Seminars	
Laboratory practical	
Tests	Description
Objective questions exam	

## Assessment

	Description	Qualification	Training and Learning Results
Lecturing	(*)se evaluará a través dunha proba escrita	60	
Seminars	(*)se evaluará a través de probas curtas, exposición oráis, resolución de problemas, etc.	25	
Laboratory practical	(*)se evaluará a través do traballo realizado no laboratorio e de unha memoria	15	

## Other comments on the Evaluation

## Sources of information

### Basic Bibliography

S. Elliot, **The Physics and Chemistry of Solids**, Wiley&Sons, 2008

P. A. Cox, **The Electronic Structure and Chemistry of Solids**, Oxford University Press,

J. M. Ziman, **Principles of the Theory of Solids**, Cambridge University Press,

J. B. Goodenough, **Magnetism and the Chemical Bond**, Interscience Publishers,

Craig F. Bohren, Donald R. Huffman, **Absorption and Scattering of Light by Small Particles**, WILEY&VCH Verlag GmbH & Co. KGaA,

C. Kittel, **Introduction to Solid State Physics**, 8<sup>a</sup>, Wiley, 2005

J. Maza, J. Mosqueira, J.A. Veira, **Física del Estado Solido**, USC publicaciones., 2012

N.W. Ashcroft and N.V. Mermin, **Solid State Physics**, SaunderS College, 1976

John Singleton, **Band Theory and Electronic Properties of Solids**, Oxford Master Series in Physics, 2001

Ewen Smith, Geoffrey Dent, **Modern Raman Spectroscopy □ A Practical Approach**, hn Wiley & Sons, Ltd, 2005

**Complementary Bibliography**

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## **Recommendations**

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**IDENTIFYING DATA****Chromatography and Analytical Separation**

Subject	Chromatography and Analytical Separation			
Code	V11M162V02128			
Study programme	Máster Universitario en Investigación Química y Química Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	2nd
Teaching language	Spanish			
Department				
Coordinator	Terán Moldes, María del Carmen			
Lecturers	Martínez Fernández, Claudio Pérez Santin, Efrén Terán Moldes, María del Carmen			
E-mail	mcteran@uvigo.es			
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>			
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/analytical-separation-and-chromatography-techniques-17772-17018-3-92897">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/analytical-separation-and-chromatography-techniques-17772-17018-3-92897</a>			

**Training and Learning Results**

Code

**Expected results from this subject**

Expected results from this subject	Training and Learning Results
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**Contents**

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**Planning**

Class hours	Hours outside the classroom	Total hours
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\*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

**Methodologies**

Description

**Personalized assistance****Assessment**

Description	Qualification	Training and Learning Results
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**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****Industrial Chemistry: Process control**

Subject	Industrial Chemistry: Process control			
Code	V11M162V02129			
Study programme	Máster Universitario en Investigación Química y Química Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	2nd
Teaching language	Spanish			
Department				
Coordinator	Sánchez Vázquez, Pablo Breogán			
Lecturers	Sánchez Vázquez, Pablo Breogán			
E-mail	pabsanchez@uvigo.es			
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>			
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/industrial-chemistry-process-control-17773-17019-3-91621">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/industrial-chemistry-process-control-17773-17019-3-91621</a>			

**Training and Learning Results**

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**Planning**

	Class hours	Hours outside the classroom	Total hours
*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.			

**Methodologies**

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**Personalized assistance****Assessment**

Description	Qualification	Training and Learning Results
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**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****Quality in the Chemistry Laboratory**

Subject	Quality in the Chemistry Laboratory			
Code	V11M162V02130			
Study programme	Máster Universitario en Investigación Química y Química Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	1st
Teaching language	Spanish			
Department				
Coordinator	Terán Moldes, María del Carmen			
Lecturers	Romero Rivas, Vanesa Terán Moldes, María del Carmen			
E-mail	mcteran@uvigo.es			
Web				
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/2023-2024/quality-chemical-laboratories-17773-17019-3-91622">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/2023-2024/quality-chemical-laboratories-17773-17019-3-91622</a>			

**Training and Learning Results**

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**Expected results from this subject**

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	Class hours	Hours outside the classroom	Total hours
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\*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

**Methodologies**

Description
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**Personalized assistance****Assessment**

Description	Qualification	Training and Learning Results
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**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****Industrial Safety**

Subject Industrial Safety

Code V11M162V02131

Study Máster Universitario en  
programme Investigación Química y  
Química Industrial

Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	1st

Teaching Spanish  
language

Department

Coordinator González de Prado, Begoña

Lecturers González de Prado, Begoña

E-mail bgp@uvigo.es

Web <http://http://miqqi.webs.uvigo.es/gl/>

General description The subject guide is available at the following link:

<https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/industrial-security-1773-17019-3-91623>**Training and Learning Results**

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**Expected results from this subject**

Expected results from this subject

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Learning Results**Contents**

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**Planning**

Class hours

Hours outside the  
classroom

Total hours

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

**Methodologies**

Description

**Personalized assistance****Assessment**

Description

Qualification

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**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****Management in Chemical Industry**

Subject	Management in Chemical Industry			
Code	V11M162V02132			
Study programme	Máster Universitario en Investigación Química y Química Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	1st
Teaching language	Spanish			
Department				
Coordinator	Rosales Villanueva, Emilio			
Lecturers	Rosales Villanueva, Emilio			
E-mail	emiliorv@uvigo.es			
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>			
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/management-systems-chemical-industry-17773-17019-3-91624">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/management-systems-chemical-industry-17773-17019-3-91624</a>			

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	Class hours	Hours outside the classroom	Total hours
*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.			

**Methodologies**

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Description	Qualification	Training and Learning Results
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**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**



**IDENTIFYING DATA****Industrial Legislation**

Subject Industrial Legislation

Code V11M162V02133

Study Máster Universitario en  
programme Investigación Química y  
Química Industrial

Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	2nd

Teaching Spanish  
language

Department

Coordinator Terán Moldes, María del Carmen

Lecturers Terán Moldes, María del Carmen

E-mail mcteran@uvigo.es

Web <http://http://miqqi.webs.uvigo.es/gl/>

General The subject guide is available at the following link:

description <https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/industrial-legislation-17773-17019-3-91625>**Training and Learning Results**

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Learning Results**Contents**

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**Planning**

Class hours

Hours outside the  
classroom

Total hours

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

**Methodologies**

Description

**Personalized assistance****Assessment**

Description

Qualification

Training and Learning Results

**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****Economics and Industry**

Subject Economics and Industry

Code V11M162V02134

Study Máster Universitario en  
programme Investigación Química y  
Química Industrial

Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	1st

Teaching Galician  
language

Department

Coordinator Terán Moldes, María del Carmen

Lecturers Terán Moldes, María del Carmen

E-mail mcteran@uvigo.es

Web <http://http://miqqi.webs.uvigo.es/gl/>

General The subject guide is available at the following link:

description <https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/2023-2024/economy-and-business-17773-17019-3-91626>**Training and Learning Results**

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**Planning**

Class hours

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classroom

Total hours

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

**Methodologies**

Description

**Personalized assistance****Assessment**

Description

Qualification

Training and Learning Results

**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****Human Resources**

Subject Human Resources

Code V11M162V02135

Study Máster Universitario en  
programme Investigación Química y  
Química Industrial

Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	1st

Teaching Galician  
language

Department

Coordinator Terán Moldes, María del Carmen

Lecturers Terán Moldes, María del Carmen

E-mail mcteran@uvigo.es

Web <http://http://miqqi.webs.uvigo.es/gl/>

General description The subject guide is available at the following link:

<https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/human-resources-17773-17019-3-91627>

**Training and Learning Results**

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Topic

**Planning**

Class hours

Hours outside the  
classroom

Total hours

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

**Methodologies**

Description

**Personalized assistance****Assessment**

Description

Qualification

Training and Learning Results

**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****Project Management**

Subject Project Management

Code V11M162V02138

Study Máster Universitario en  
programme Investigación Química y  
Química Industrial

Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	1st

Teaching Spanish  
language

Department

Coordinator González de Prado, Begoña

Lecturers González de Prado, Begoña

E-mail bgp@uvigo.es

Web <http://http://miqqi.webs.uvigo.es/gl/>

General The subject guide is available at the following link:

description <https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/2023-2024/projects-management-17773-17019-3-91629>**Training and Learning Results**

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**Planning**

Class hours

Hours outside the  
classroom

Total hours

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

**Methodologies**

Description

**Personalized assistance****Assessment**

Description

Qualification

Training and Learning Results

**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****Validation of analytical methodologies**

Subject	Validation of analytical methodologies			
Code	V11M162V02140			
Study programme	Máster Universitario en Investigación Química y Química Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Mandatory	1st	1st
Teaching language	Spanish			
Department				
Coordinator	Gago Martínez, Ana Leao Martins, Jose Manuel			
Lecturers	Gago Martínez, Ana Leao Martins, Jose Manuel			
E-mail	anagago@uvigo.es leao@uvigo.es			
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>			
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/validation-analytical-methodologies-17767-17013-2-98941">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/validation-analytical-methodologies-17767-17013-2-98941</a>			

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Class hours	Hours outside the classroom	Total hours
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\*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

**Methodologies**

Description

**Personalized assistance****Assessment**

Description	Qualification	Training and Learning Results
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**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****Characterisation of materials and biointerfaces**

Subject	Characterisation of materials and biointerfaces			
Code	V11M162V02141			
Study programme	Máster Universitario en Investigación Química y Química Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Mandatory	1st	1st
Teaching language	Spanish			
Department				
Coordinator	Tojo Suárez, María Concepción Peña Gallego, María de los Ángeles			
Lecturers	Peña Gallego, María de los Ángeles Tojo Suárez, María Concepción			
E-mail	mpena@uvigo.es ctojo@uvigo.es			
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>			
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/materials-characterization-and-bio-interfaces-17767-17013-2-98942">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/materials-characterization-and-bio-interfaces-17767-17013-2-98942</a>			

**Training and Learning Results**

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**Planning**

Class hours	Hours outside the classroom	Total hours
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\*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

**Methodologies**

Description

**Personalized assistance****Assessment**

Description	Qualification	Training and Learning Results
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**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****Scientific transfer and communication**

Subject	Scientific transfer and communication			
Code	V11M162V02142			
Study programme	Máster Universitario en Investigación Química y Química Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Mandatory	1st	1st
Teaching language	Spanish			
Department				
Coordinator	Iglesias Antelo, María Beatriz Pastoriza Santos, Isabel			
Lecturers	Iglesias Antelo, María Beatriz Pastoriza Santos, Isabel			
E-mail	bantelo@uvigo.gal pastoriza@uvigo.es			
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>			
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/scientific-transfer-and-communication-17767-17013-2-98943">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/scientific-transfer-and-communication-17767-17013-2-98943</a>			

**Training and Learning Results**

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Class hours	Hours outside the classroom	Total hours
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\*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

**Methodologies**

Description

**Personalized assistance****Assessment**

Description	Qualification	Training and Learning Results
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**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****(\*)Fisicoquímica de medios naturais**

Subject	(*)Fisicoquímica de medios naturais		
Code	V11M162V02143		
Study programme	Máster Universitario en Investigación Química y Química Industrial		
Descriptors	ECTS Credits	Choose	Year
	3	Optional	1st
Teaching language	Spanish		
Department			
Coordinator	Losada Barreiro, Sonia Estévez Guance, Laura		
Lecturers	Estévez Guance, Laura Losada Barreiro, Sonia Otero Martínez, Nicolás Ramos Berdullas, Nicolás		
E-mail	sonia@uvigo.es lestevez@uvigo.es		
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>		
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/2022023/physicochemistry-natural-means-17768-17014-3-98944">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/2022023/physicochemistry-natural-means-17768-17014-3-98944</a>		

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Class hours	Hours outside the classroom	Total hours
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\*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

**Methodologies**

Description

**Personalized assistance****Assessment**

Description	Qualification	Training and Learning Results
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**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**



**IDENTIFYING DATA****(\*)Química do medio ambiente**

Subject	(*)Química do medio ambiente			
Code	V11M162V02144			
Study programme	Máster Universitario en Investigación Química y Química Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	2nd
Teaching language	Spanish			
Department				
Coordinator	Couce Fortúnez, María Delfina Iglesias Antelo, María Beatriz			
Lecturers	Couce Fortúnez, María Delfina Iglesias Antelo, María Beatriz			
E-mail	bantelo@uvigo.gal delfina@uvigo.es			
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>			
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/2023-2024/environmental-chemistry-17768-17014-3-98945">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/2023-2024/environmental-chemistry-17768-17014-3-98945</a>			

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**Planning**

Class hours	Hours outside the classroom	Total hours
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\*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

**Methodologies**

Description

**Personalized assistance****Assessment**

Description	Qualification	Training and Learning Results
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**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****(\*)Técnicas para o control da contaminación ambiental**

Subject	(*)Técnicas para o control da contaminación ambiental		
Code	V11M162V02145		
Study programme	Máster Universitario en Investigación Química y Química Industrial		
Descriptors	ECTS Credits	Choose	Year
	3	Optional	1st
Teaching language	Spanish		
Department			
Coordinator	González Romero, Elisa		
Lecturers	González Romero, Elisa		
E-mail	eromero@uvigo.es		
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>		
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/techniques-control-environmental-pollution-17768-17014-3-98946">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/techniques-control-environmental-pollution-17768-17014-3-98946</a>		

**Training and Learning Results**

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**Expected results from this subject**

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Topic

**Planning**

	Class hours	Hours outside the classroom	Total hours
Lecturing	16	24	40
Workshops	6	17	23
Objective questions exam	2	10	12

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

**Methodologies**

Description

Lecturing	
Workshops	

**Personalized assistance**

Methodologies	Description
Lecturing	
Workshops	

**Assessment**

	Description	Qualification	Training and Learning Results
Workshops		0	
Objective questions exam		0	

**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**



**IDENTIFYING DATA****(\*)Xestión e valorización de residuos**

Subject	(*)Xestión e valorización de residuos			
Code	V11M162V02146			
Study programme	Máster Universitario en Investigación Química y Química Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	1st
Teaching language	Spanish			
Department				
Coordinator	Terán Moldes, María del Carmen			
Lecturers	Terán Moldes, María del Carmen			
E-mail	mcteran@uvigo.es			
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>			
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/waste-management-and-recovery-17768-17014-3-98947">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/waste-management-and-recovery-17768-17014-3-98947</a>			

**Training and Learning Results**

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**Planning**

	Class hours	Hours outside the classroom	Total hours
*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.			

**Methodologies**

Description

**Personalized assistance****Assessment**

Description	Qualification	Training and Learning Results
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**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****(\*)Energía e medio ambiente**

Subject	(*)Energía e medio ambiente			
Code	V11M162V02147			
Study programme	Máster Universitario en Investigación Química y Química Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	1st
Teaching language	Spanish			
Department				
Coordinator	Terán Moldes, María del Carmen			
Lecturers	Rodríguez González, José Antonio Terán Moldes, María del Carmen			
E-mail	mcteran@uvigo.es			
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>			
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/2023-2024/energy-and-environment-17768-17014-3-98948">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/2023-2024/energy-and-environment-17768-17014-3-98948</a>			

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**Planning**

	Class hours	Hours outside the classroom	Total hours
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\*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

**Methodologies**

Description

**Personalized assistance****Assessment**

Description	Qualification	Training and Learning Results
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**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****Initiation to research**

Subject	Initiation to research			
Code	V11M162V02148			
Study programme	Máster Universitario en Investigación Química y Química Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	1st	An
Teaching language	Spanish			
Department				
Coordinator	Terán Moldes, María del Carmen Pérez Juste, Ignacio			
Lecturers	Pérez Juste, Ignacio Terán Moldes, María del Carmen			
E-mail	uviqpij@uvigo.es mcteran@uvigo.es			
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>			
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/initiation-research-17772-17018-3-98957">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/initiation-research-17772-17018-3-98957</a>			

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

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**Personalized assistance****Assessment**

Description	Qualification	Training and Learning Results
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**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****Clinical and methodological analyzes**

Subject	Clinical and methodological analyzes			
Code	V11M162V02149			
Study programme	Máster Universitario en Investigación Química y Química Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	1st
Teaching language	Spanish			
Department				
Coordinator	Terán Moldes, María del Carmen			
Lecturers	Terán Moldes, María del Carmen			
E-mail	mcteran@uvigo.es			
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>			
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/clinical-and-toxicological-analyzes-17770-17016-3-98950">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/clinical-and-toxicological-analyzes-17770-17016-3-98950</a>			

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	Class hours	Hours outside the classroom	Total hours
*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.			

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**Personalized assistance****Assessment**

Description	Qualification	Training and Learning Results
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**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****Polymeric molecular materials**

Subject	Polymeric molecular materials			
Code	V11M162V02150			
Study programme	Máster Universitario en Investigación Química y Química Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	1st
Teaching language	Spanish			
Department				
Coordinator	Novoa Carballal, Ramón			
Lecturers	Kiriakidi , Sofía Novoa Carballal, Ramón			
E-mail	ramon.novoa@uvigo.es			
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>			
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/molecular-and-polymeric-materials-17771-17017-3-98952">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/molecular-and-polymeric-materials-17771-17017-3-98952</a>			

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

**Methodologies**

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**Personalized assistance****Assessment**

Description	Qualification	Training and Learning Results
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**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**



**IDENTIFYING DATA****(\*Aplicacións dos nanomateriais e novos materiais**

Subject	(*)Aplicacións dos nanomateriais e novos materiais		
Code	V11M162V02151		
Study programme	Máster Universitario en Investigación Química y Química Industrial		
Descriptors	ECTS Credits	Choose	Year
	3	Optional	1st
Teaching language	Spanish		
Department			
Coordinator	Rodríguez Arguelles, María Carmen		
Lecturers	González Ballesteros, Noelia Rodríguez Arguelles, María Carmen		
E-mail	mcarmen@uvigo.es		
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>		
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/applications-nanomateriais-and-new-materials-17771-17017-3-98953">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/applications-nanomateriais-and-new-materials-17771-17017-3-98953</a>		

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

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**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****(\*)Técnicas avanzadas de preparación da mostra**

Subject	(*)Técnicas avanzadas de preparación da mostra			
Code	V11M162V02152			
Study programme	Máster Universitario en Investigación Química y Química Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	1st
Teaching language	Spanish			
Department				
Coordinator	Pena Pereira, Francisco Javier Calle González, Inmaculada de la			
Lecturers	Calle González, Inmaculada de la Pena Pereira, Francisco Javier Romero Rivas, Vanesa			
E-mail	incalle@uvigo.es fjpena@uvigo.es			
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>			
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/advanced-techniques-sample-preparation-17772-17018-3-98954">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/advanced-techniques-sample-preparation-17772-17018-3-98954</a>			

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

**Methodologies**

Description

**Personalized assistance****Assessment**

Description	Qualification	Training and Learning Results
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**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****(\*)Técnicas atómicas avanzadas e sensores**

Subject	(*)Técnicas atómicas avanzadas e sensores		
Code	V11M162V02153		
Study programme	Máster Universitario en Investigación Química y Química Industrial		
Descriptors	ECTS Credits	Choose	Year
	3	Optional	1st
Teaching language	Spanish		
Department			
Coordinator	González Romero, Elisa		
Lecturers	González Romero, Elisa		
E-mail	eromero@uvigo.es		
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>		
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/advanced-atomic-techniques-and-sensors-17772-17018-3-98955">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/advanced-atomic-techniques-and-sensors-17772-17018-3-98955</a>		

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**Planning**

	Class hours	Hours outside the classroom	Total hours
Lecturing	16	24	40
Workshops	6	17	23
Objective questions exam	2	10	12

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

**Methodologies**

	Description
Lecturing	
Workshops	

**Personalized assistance**

Methodologies	Description
Lecturing	
Workshops	

**Assessment**

	Description	Qualification	Training and Learning Results
Workshops		0	
Objective questions exam		0	

**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**



**IDENTIFYING DATA****(\*)Espectrometría de masas analítica**

Subject	(*)Espectrometría de masas analítica			
Code	V11M162V02154			
Study programme	Máster Universitario en Investigación Química y Química Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	2nd
Teaching language	Spanish			
Department				
Coordinator	Terán Moldes, María del Carmen			
Lecturers	Terán Moldes, María del Carmen			
E-mail	mcteran@uvigo.es			
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>			
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/analytical-mass-spectrometry-17772-17018-3-98956">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/analytical-mass-spectrometry-17772-17018-3-98956</a>			

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	Class hours	Hours outside the classroom	Total hours
*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.			

**Methodologies**

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**Personalized assistance****Assessment**

Description	Qualification	Training and Learning Results
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**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****(\*)Espectroscopia de fluorescencia e fotoquímica**

Subject	(*)Espectroscopia de fluorescencia e fotoquímica			
Code	V11M162V02155			
Study programme	Máster Universitario en Investigación Química y Química Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	1st	1st
Teaching language	Spanish			
Department				
Coordinator	Prieto Jiménez, Inmaculada			
Lecturers	Prieto Jiménez, Inmaculada			
E-mail	iprieto@uvigo.es			
Web	<a href="http://http://miqqi.webs.uvigo.es/gl/">http://http://miqqi.webs.uvigo.es/gl/</a>			
General description	The subject guide is available at the following link: <a href="https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/fluorescence-and-photochemical-spectroscopy-op-17772-17018-3-91603">https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/fluorescence-and-photochemical-spectroscopy-op-17772-17018-3-91603</a>			

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

**Methodologies**

Description

**Personalized assistance****Assessment**

Description	Qualification	Training and Learning Results
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**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**

**IDENTIFYING DATA****Final Dissertation**

Subject Final Dissertation

Code V11M162V02156

Study Máster Universitario en  
programme Investigación Química y  
Química IndustrialDescriptors ECTS Credits  
24Choose  
MandatoryYear  
1stQuadmester  
2ndTeaching Spanish  
language

Department

Coordinator García Fontán, María Soledad

Lecturers García Fontán, María Soledad

E-mail sgarcia@uvigo.es

Web <http://http://miqqi.webs.uvigo.es/gl/>

General The subject guide is available at the following link:

description <https://www.usc.gal/en/studies/masters/science/master-chemical-investigation-research-and-industrial-chemistry/20232024/masters-thesis-17774-17020-2-98958>**Training and Learning Results**

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Expected results from this subject

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Class hours

Hours outside the  
classroom

Total hours

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

**Methodologies**

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**Personalized assistance****Assessment**

Description

Qualification

Training and Learning Results

**Other comments on the Evaluation****Sources of information****Basic Bibliography****Complementary Bibliography****Recommendations**