UNIVERSIDADE DA CORUÑA

Teaching Guide			
Identifying Data			2017/18
Subject (*)	Fluorescence Spectroscopy and Photochemistry	Code	610509108
Study programme	Mestrado Universitario en Investigación Química e Química Industrial (Plan 2017)		

Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	Yearly	First	Optativa	3

Language	Spanish		
Teaching method	Face-to-face		
Prerequisites			
Department	Química		
Coordinador	Fernandez Perez, Maria Isabel	E-mail	isabel.fernandez.perez@udc.es
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Web			
General description			

Study programme competences	
Code	Study programme competences
A1	Define concepts, principles, theories and specialized facts of different areas of chemistry.
A3	Innovate in the methods of synthesis and chemical analysis related to the different areas of chemistry
A7	Operate with advanced instrumentation for chemical analysis and structural determination.
B2	Students should apply their knowledge and ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study.
B3	Students should be able to integrate knowledge and handle complexity, and formulate judgments based on information that was incomplete or limited, include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgments.
B7	Identify information from scientific literature by using appropriate channels and integrate such information to raise and contextualize a research topic
B10	Use of scientific terminology in English to explain the experimental results in the context of the chemical profession
B11	Apply correctly the new technologies to gather and organize the information to solve problems in the professional activity.
C1	CT1 - Elaborar, escribir e defender publicamente informes de carácter científico e técnico
C3	CT3 - Traballar con autonomía e eficiencia na práctica diaria da investigación ou da actividade profesional.
C4	CT4 - Apreciar o valor da calidade e mellora continua, actuando con rigor, responsabilidade e ética profesional.

Learning outcomes			
Learning outcomes	Study programme competences		
	AC1 AC3 AC7	BC2 BC3 BC7 BC10 BC11	CC1 CC3 CC4
	AC1 AC3 AC7	BC2 BC3 BC7 BC10 BC11	CC1 CC3 CC4

	AC1 AC3 AC7	BC2 BC3 BC7 BC10 BC11	CC1 CC3 CC4
	AC1 AC3 AC7	BC2 BC3 BC7 BC10 BC11	CC1 CC3 CC4
	AC1 AC3 AC7	BC2 BC3 BC7 BC10 BC11	CC1 CC3 CC4
	AC1 AC3 AC7	BC2 BC3 BC7 BC10 BC11	CC1 CC3 CC4
	AC1 AC3 AC7	BC2 BC3 BC7 BC10 BC11	CC1 CC3 CC4

Contents

Topic	Sub-topic
Tema 1. Fundamentos de espectroscopia electrónica y espectroscopia de fluorescencia.	Fenómenos luminiscentes. Procesos radiantes y no radiantes. Características de los espectros de excitación y emisión de fluorescencia. Rendimiento cuántico de fluorescencia. Tiempo de vida de fluorescencia. Efecto del disolvente en la fluorescencia.
Tema 2. Estados electrónicos excitados y fotoquímica.	Formación de complejos en estado excitado: excímeros y exciplejos. Transferencia electrónica fotoinducida. Transferencia protónica fotoinducida. Otras reacciones fotoquímicas.
Tema 3. Técnicas experimentales	Medida de espectros de fluorescencia: el espectrofluorímetro. Corrección de espectros de excitación y emisión. Técnicas de medida de luminiscencia. Medida de tiempos de vida de fluorescencia mediante la técnica de recuento de fotones individuales.
Tema 4. Extinción de la fluorescencia.	Extinción colisional o dinámica. Ecuación de Stern-Volmer. Extinción estática. Extinción estática y dinámica. Aplicaciones en el estudio de formación de complejos y cambios conformacionales en macromoléculas.
Tema 5. Transferencia de energía electrónica.	Mecanismos de la transferencia de energía electrónica. Determinación de distancias mediante FRET. Aplicaciones en la determinación de distancias dador-aceptor y en el estudio de asociaciones supramoleculares. Fotosensibilización y terapia fotodinámica. Microscopía de fluorescencia.
Tema 6. Sondas fluorescentes.	Tipos de sondas fluorescentes. Aplicaciones en biomedicina, análisis, medio ambiente y materiales. Biosensores. Fluorescencia de moléculas individuales.

Planning

Methodologies / tests	Competencies	Ordinary class hours	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A1 B2 B3 B10	12	6	18
Seminar	A7 B2 B3 B7 B10	7	13	20
Supervised projects	A3 B2 B3 B7 B10 B11 C1 C3 C4	20	13	33
Objective test	A1 A3 A7 B2 B10 C4	2	0	2
Personalized attention		2	0	2
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	Description
Guest lecture / keynote speech	
Seminar	
Supervised projects	
Objective test	

Personalized attention	
Methodologies	Description
Supervised projects	Tutorías programadas por el profesor y coordinadas por la Comisión Académica del Máster. Supondrán para cada alumno 2 horas.

Assessment			
Methodologies	Competencies	Description	Qualification
Seminar	A7 B2 B3 B7 B10		20
Supervised projects	A3 B2 B3 B7 B10 B11 C1 C3 C4		20
Objective test	A1 A3 A7 B2 B10 C4		60

Assessment comments

Sources of information	
Basic	- Joseph R. Lakowicz (2006). Principles of Fluorescence Spectroscopy, 3rd Ed. Springer, New York - Bernard Valeur (2012). Molecular Fluorescence. Principles and Applications, 2nd Ed. Wiley-VCH, Weinheim - Petr Klán y Jacob Wirz (2009). Photochemistry of Organic Compounds: From Concepts to Practice,. Wiley, Chichester
Complementary	

Recommendations
Subjects that it is recommended to have taken before
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Other comments

(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.