

		Teaching Guide			
	Identifying I	Data			2018/19
Subject (*)	Medicinal Chemistry	Medicinal Chemistry Code			610G01040
Study programme	Grao en Química				
		Descriptors			
Cycle	Period	Year		Туре	Credits
Graduate	2nd four-month period	Fourth		Optional	4.5
Language	Spanish		I		
Teaching method	Face-to-face				
Prerequisites					
Department	Química				
Coordinador	García Romero, Marcos Daniel		E-mail	marcos.garcia1	@udc.es
Lecturers	García Romero, Marcos Daniel		E-mail	marcos.garcia1@udc.es	
Web		I			
General description	An introductory course in Medicinal (Chemistry is offered.	Basic conce	epts related to the s	tructure and activity of drugs,
	mechanisms of action and metabolis	m are covered. Main	strategies i	in the design and sy	nthesis of drugs are also analyzed.

	Study programme competences
Code	Study programme competences
A1	Ability to use chemistry terminology, nomenclature, conventions and units
A9	Knowledge of structural characteristics of chemical and stereochemical compounds, and basic methods of structural analysis and
	research
A10	Knowledge of chemical kinetics, catalysis and reaction mechanisms
A13	Understanding of chemistry of main biological processes
A14	Ability to demonstrate knowledge and understanding of concepts, principles and theories in chemistry
A15	Ability to recognise and analyse new problems and develop solution strategies
A16	Ability to source, assess and apply technical bibliographical information and data relating to chemistry
A17	Ability to work safely in a chemistry laboratory (handling of materials, disposal of waste)
A18	Risk management in relation to use of chemical substances and laboratory procedures
A19	Ability to follow standard procedures and handle scientific equipment
A20	Ability to interpret data resulting from laboratory observation and measurement
A21	Understanding of qualitative and quantitative aspects of chemical problems
A22	Ability to plan, design and develop projects and experiments
A23	Critical standards of excellence in experimental technique and analysis
A24	Ability to explain chemical processes and phenomena clearly and simply
A25	Ability to recognise and analyse link between chemistry and other disciplines, and presence of chemical processes in everyday life
A26	Ability to follow standard laboratory procedures in relation to analysis and synthesis of organic and inorganic systems
B1	Learning to learn
B2	Effective problem solving
B3	Application of logical, critical, creative thinking
B4	Working independently on own initiative
B6	Ethical, responsible, civic-minded professionalism
B7	Effective workplace communication
C1	Ability to express oneself accurately in the official languages of Galicia (oral and in written)
C2	Oral and written proficiency in a foreign language
C3	Ability to use basic information and communications technology (ICT) tools for professional purposes and learning throughout life
C4	Self-development as an open, educated, critical, engaged, democratic, socially responsible citizen, equipped to analyse reality, diagnose
	problems, and formulate and implement informed solutions for the common good
C6	Ability to assess critically the knowledge, technology and information available for problem solving
C7	Acceptance as a professional and as a citizen of importance of lifelong learning



Learning outcomes				
Learning outcomes	Study	/ progra	amme	
		competences		
Know the structure and mode of action of drugs and the relationship with biological activity	A1	B1	C1	
	A9	B2	C2	
	A10	B3	C3	
	A13	B4	C4	
	A14	B6	C6	
	A15	B7	C7	
	A16		C8	
	A21			
	A24			
	A25			
Know basic principles and strategies used to design and synthesized drugs.	A1	B1	C1	
	A9	B2	C2	
	A10	B3	СЗ	
	A13	B4	C4	
	A14	B6	C6	
	A15	B7	C7	
	A16		C8	
	A17			
	A18			
	A19			
	A20			
	A21			
	A22			
	A23			
	A24			
	A25			
	A26			
Know the impact of drugs and the pharmaceutical companies in the society.	A13	B1	C1	
	A14	B3	C3	
	A16	B4	C6	
	A24	B6	C7	
	A25	B7	C8	
The students should be able to identify apropriate information on the scientific literature, assess their responsibility in the	A14	B1	C1	
management of information and knowledge in the field of Industrial Chemistry and the Chemical Research, use scientific	A15	B2	C2	
terminology and appreciate the value of quality and continuous improvement	A16	B3	C3	
	A22	B4	C4	
	A24	B6	C6	
	A25		C7	
			C8	

C8 Understanding role of research, innovation and technology in socio-economic and cultural development

	Contents
Торіс	Sub-topic



Chapter 1. Basic principles in Medicinal Chemistry	1.1 Medicinal Chemistry : definition and basic concepts
	1.2 Historical Perspective .
	1.3 Pharmacokinetics and Pharmacodynamics
	Drug Discovery 1.4
	1.5 Drugs: nomenclature and classification
Chapter 2. Molecular basis on pharmacological activity:	2.1 Drug-receptor interactions . Molecular topology and biological activity
Pharmacodynamics	2.2 Proteins: structure and function. Protein Interactions
	2.3 Enzymes: enzymatic catalysis. Michaelis - Menten equation . Enzyme inhibition :
	Types
	2.5 Cell receptors: structure and classification .
	2.6 Nucleic Acids . Structure and functions. Drug interactions with nucleic acids
	2.7 Interactions with lipid and carbohydrate
Chapter 3. Phramacokinetics	3.1 ADME processes.
	3.2 Absorption of drugs. Modes of administration . Physicochemical properties of
	drugs : Lipinsky rules . Bioavailability .
	3.3 Distribution of drugs. Blood : composition and properties. Removal rate . Mid life.
	Volume of distribution
	3.4 Drug metabolism : metabolism in phase I and phase II
	3.5 Elimination of drugs.
Chapter 5. Drug discovery	4.1 Steps in drug discovery. Biological target vs Phenotypic approach. Structural
	diversity. Chemical space. Drug binding energy. High Throughput Screening (HTS).
	Chemical libraries: combinatorial chemistry , parallel synthesis , solid phase synthesis
	4.2 Strategies in drug discovery (lead discovery) . Screening modes . Drug screening
	methods . Drug Design
	4.3 Optimization of drugs (lead optimization) . Structure- actividadIdentificación
	pharmacophore . Pharmacomodulation : modification of functional groups.
	Optimization receptor binding and pharmacokinetics .
Chapter 7. Drug synthesis	Main synthetis methods for the synthesis of drugs

	Planning			
Methodologies / tests	Competencies	Ordinary class	Student?s personal	Total hours
		hours	work hours	
Guest lecture / keynote speech	A1 A9 A10 A13 A14	16	16	32
	A15 A16 A21 A24			
	A25 B1 B2 B3 B4 B6			
	B7 C1 C3 C4 C6 C7			
	C8			
Seminar	A1 A9 A10 A13 A14	7	28	35
	A15 A16 A21 A24			
	A25 B1 B2 B3 B4 B6			
	B7 C1 C3 C4 C6 C7			
	C8			
Laboratory practice	A9 A13 A14 A15 A16	10	10.5	20.5
	A17 A18 A19 A20			
	A22 A23 A25 A26 B1			
	B2 B3 B4 B6 B7 C1			
	C2 C3 C4 C6 C7 C8			
Mixed objective/subjective test	A1 A9 A13 A14 A15	4	20	24
	B2 B3 B6 C6 C1			
Personalized attention		1	0	1



(*) 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 /	The contents will be presented. During the presentations the teacher can provide supplementary material to the literature with
keynote speech	the aim that the explanations can be tracked effectively. The ability to create notes and search for information will also be
	developed.
Seminar	The contents of each chapter will be discussed in seminars by solving exercises and analysis of practical cases. Students will
	have early enough problem sets through the Moodle platform. We may request delivery of solved exercises.
Laboratory practice	Practices involving the use of software and web resources for the rational design of drugs and / or experiments related for the
	synthesis of drugs is proposed.
Mixed	A test with questions related to the contents of the subject will be asked.
objective/subjective	
test	

	Personalized attention
Methodologies	Description
Guest lecture /	This activity will be headed to the individual assistance for explanations, doubts, as well as to the resolution of the exercises.
keynote speech	
Laboratory practice	Part-time students and those with special academic leave permission could ask for presential or email tutorials when
Seminar	necessary.

		Assessment	
Methodologies	Competencies	Description	Qualification
Mixed	A1 A9 A13 A14 A15	The responses in the written exam will be evaluated.	60
objective/subjective	B2 B3 B6 C6 C1		
test			
Guest lecture /	A1 A9 A10 A13 A14	Attendance and participation in class will be assessed	5
keynote speech	A15 A16 A21 A24		
	A25 B1 B2 B3 B4 B6		
	B7 C1 C3 C4 C6 C7		
	C8		
Laboratory practice	A9 A13 A14 A15 A16	Attendance and the final report will be assessed.	15
	A17 A18 A19 A20		
	A22 A23 A25 A26 B1		
	B2 B3 B4 B6 B7 C1		
	C2 C3 C4 C6 C7 C8		
Seminar	A1 A9 A10 A13 A14	The active participation of students in solving the problems of the bulletins and	20
	A15 A16 A21 A24	assignment submitted will be assessed.	
	A25 B1 B2 B3 B4 B6		
	B7 C1 C3 C4 C6 C7		
	C8		

Assessment comments



The assistance to the lectures, seminars and practicals is mandatory. A student can obtain the qualification of "Not presented" if do not realise activities with an upper computation to 50% in the evaluation or not to present to the mixed test. The students will have two opportunities, and those that do not surpass the subject in the first opportunity will conserve the qualification obtained in the seminars and laboratory practicals, and will realise a second mixed test in the determinate dates by the calendar fixed by the Board of Faculty. The students that are evaluated in the second opportunity only will be able to opt to the "matrícula de honor" (highest qualification) if these have not been covered at the first opportunity. Part-time students or students with special academic permission (according to the rules of the UDC):

The

same evaluation criteria listed above would be applied, but being not

mandatory to attend classroom lectures and seminars.

Nevertheless, It is compulsory to attend practical sessions, but it will be tried to fit the dates to the student's availability. When not possible otherwise, these students should exchange the practical activities by tasks related that

not require attendance.

The

final grade will be the sum of 15% of the mark obtained in the lab practice and 85% of the mark obtained in the mixed test. The same criteria will be applied to both opportunities.

Students who has not attended the final exam will be assessed as "non attendance".

For all the students, the education-learning process, included the evaluation, refers to an academic course and starts every new academic course, including all the activities and procedures of evaluation programed.

	Sources of information
Basic	- Delgado, A.; Minguillón, C.; Joglar, J. (2002). Introducción a la síntesis de fármacos. Madrid: Síntesis
	- Avendaño, C (2001). Introducción a la Química Farmacéutica. Madrid: McGraw-Hill
	- Delgado, A.; Minguillón, C.; Joglar, J. (2003). Introducción a la Química Terapéutica. Madrid: Díaz de Santos
	- Patrick, G. L (2013). An Introduction to Medicinal Chemistry. 5th ed New York: Oxford University Press
	- Thomas, Gareth (2007). Medicinal Chemistry: An introduction. Wiley
	- Stevens, E. (2014). Medicinal Chemistry, an Introduction Pearson Education. New York.
Complementary	

Recommendations
Subjects that it is recommended to have taken before
Organic Chemistry 1/610G01026
Organic Chemistry 2/610G01027
Intermediate Organic Chemistry/610G01028
Advanced Organic Chemistry/610G01030
Subjects that are recommended to be taken simultaneously
Final Dissertation/610G01043
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.