

BASIC DETAILS:

Subject:	QUÍMICA FARMACÉUTICA II		
Id.:	33338		
Programme:	DOBLE GRADO EN FARMACIA Y BIOINFORMÁTICA. PLAN 2018		
Module:	QUÍMICA		
Subject type:	OBLIGATORIA		
Year:	3	Teaching period:	Primer Cuatrimestre
Credits:	6	Total hours:	150
Classroom activities:	78	Individual study:	72
Main teaching language:	Castellano	Secondary teaching language:	Inglés
Lecturer:	LANGA MORALES, ELISA (T) B A L L E S T E R O FERNANDEZ, DIEGO	Email:	elanga@usj.es dballester@usj.es

PRESENTATION:

Pharmaceutical Chemistry II may be one of the most multidisciplinary subjects in the Pharmacy Degree because it encompasses contents from other previous subjects, such as Biology, Mathematics, Organic and Inorganic chemistry, among others, and it is an essential subject in the education of any pharmacist. This subject is under Chemistry in the Pharmacy Curriculum.

The main goal of Pharmaceutical Chemistry II is to study drugs -from a chemical point of view- and the basic principles to create effective and safe drugs. To achieve this purpose, knowing the relationship between the structure of chemical compounds and their activity is required for each drug.

PROFESSIONAL COMPETENCES ACQUIRED IN THE SUBJECT:

General programme competences	G01	Ability to express opinions and propose arguments effectively both orally and in writing. Effectively use language skills to express views and formulate arguments both orally and in writing.
	G02	Troubleshooting and decision-making.
	G03	Ability for autonomous learning and self-criticism.
	G04	Ability to effectively use new information and communications technology to improve written and oral presentations and to facilitate data analysis.
	G05	Ability for teamwork, actively contributing to the objectives and the organisation of a team.
	G06	Ability to transfer the knowledge acquired in practical work and skills to the field of work.
	G07	Demonstrate creativity, independence of thought, autonomy.
	G08	Demonstrate critical and analytical ability to conventional approaches of the discipline.
	G09	Demonstrate capacity for innovation, creativity and initiative.
	G11	Knowledge of the English language for use in professional environments.
Specific programme competences	E01	Identify, design, collect, analyse and produce active ingredients, drugs and other products and materials related to the health sector.
	E02	Select the appropriate techniques and procedures in the design, implementation and evaluation of reagents and analytical techniques and methods.
	E03	Llevar a cabo procesos de laboratorio estándar incluyendo el uso de equipos científicos de síntesis y análisis, instrumentación apropiada incluida.
	E04	Assess the risks associated with the use of chemicals substances and laboratory processes.
	E05	Conocer las características físico-químicas de las sustancias utilizadas para la fabricación de los medicamentos.
	E06	Conocer y comprender las características de las reacciones en disolución, los diferentes estados de la materia y los principios de la termodinámica y su aplicación a las ciencias farmacéuticas.
	E07	Conocer y comprender las propiedades características de los elementos y sus compuestos, así como su aplicación en el ámbito farmacéutico.

	E08	Conocer y comprender la naturaleza y comportamientos de los grupos funcionales en moléculas orgánicas.
	E09	Conocer el origen, naturaleza, diseño, obtención análisis y control de medicamentos y productos sanitarios.
	E10	Conocer los principios y procedimientos para la determinación analítica de compuestos: técnicas analíticas aplicadas al análisis de agua, alimentos y medio ambiente.
	E11	Know about and apply the main techniques of structural investigation including spectroscopy.
	E28	Aplicar el control de calidad de productos sanitarios, dermofarmacéuticos y cosméticos y materiales de acondicionamiento.
	E31	Conocer las propiedades físico-químicas y biofarmacéuticas de los principios activos y excipientes así como las posibles interacciones entre ambos.
	E35	Utilizar de forma segura los medicamentos teniendo en cuenta sus propiedades físicas y químicas incluyendo cualquier riesgo asociado a su uso.
Regulated profession competences	P01	Identify, design, collect, analyse, control and produce drugs and medication and other healthcare products for human and veterinary use.
	P03	Know how to apply the scientific method and acquire skills in handling legislation, sources, bibliography, developing protocols and other aspects considered necessary for the critical design and evaluation of preclinical and clinical trials.
	P10	Diseñar, aplicar y evaluar reactivos, métodos y técnicas analíticas clínicas, conociendo los fundamentos básicos de los análisis clínicos y las características y contenidos de los dictámenes de diagnóstico de laboratorio.
	P15	Recognise the limitations and the need to maintain and update professional skills, with particular emphasis on self-learning of new knowledge based on the available scientific evidence.

PRE-REQUISITES:

Students should have previous knowledge of biology, mathematics, general chemistry and organic chemistry.

SUBJECT PROGRAMME:

Subject contents:

1 - BASIC CONCEPTS
1.1 - What is Pharmaceutical Chemistry?
1.2 - Steps in Pharmaceutical Chemistry
1.3 - Key words and definitions
2 - DRUG CLASSIFICATION
2.1 - Different types of drug classification
3 - NOMENCLATURE
3.1 - Introduction
3.2 - Code names
3.3 - Trade names
3.4 - Common denominations
3.5 - Chemical names: systematic and semisystematic
4 - RECEPTORS AND INTERACTIONS
4.1 - Biological receptors and ligands
4.2 - Drug-receptor interactions
5 - DRUG METABOLISM
5.1 - Introduction
5.2 - Phase I reactions
5.3 - Phase II reactions
6 - PRODRUGS
6.1 - Introduction
6.2 - Types of prodrugs
6.3 - Activation mechanism of prodrugs

7 - OPTIMIZATION OF A PROTOTYPE I
7.1 - Introduction
7.2 - Different types of molecular modification
7.3 - Classical criteria for the systematic modification of structural entities
7.4 - An example of application: modifications on the peptidic bond
8 - OPTIMIZATION OF A PROTOTYPE II: QSAR
8.1 - Introduction
8.2 - Solubility descriptors for drugs
9 - DRUGS ACTING ON ION CHANNELS AND OTHER MEMBRANE RECEPTORS
9.1 - Introduction
9.2 - Ionic channels
9.3 - Other related receptors
10 - CHEMOTHERAPEUTIC DRUGS
10.1 - Introduction
10.2 - Mode of action of some chemotherapeutic drugs
11 - PHARMACODYNAMIC DRUGS
11.1 - Introduction
11.2 - Mode of action of some pharmacodynamics drugs

Subject planning could be modified due unforeseen circumstances (group performance, availability of resources, changes to academic calendar etc.) and should not, therefore, be considered to be definitive.

TEACHING AND LEARNING METHODOLOGIES AND ACTIVITIES:

Teaching and learning methodologies and activities applied:

This subject is based on active participation, for which different teaching and learning methodologies will be applied: Master classes (Lecturing), Flipped classroom approach, Collaborative work, Problem-based learning, Role playing and Gamification. A socio-constructivist approach will be used to teaching and learning and learner autonomy and responsibility is, therefore, essential to achieve the required tasks.

Student work load:

Teaching mode	Teaching methods	Estimated hours
Classroom activities	Master classes	32
	Other theory activities	1
	Practical exercises	10
	Practical work, exercises, problem-solving etc.	10
	Coursework presentations	1
	Films, videos, documentaries etc.	1
	Laboratory practice	16
	Participation in seminars, conferences etc.	1
	Assessment activities	6
Individual study	Tutorials	1
	Individual study	52
	Individual coursework preparation	2
	Group coursework preparation	13
	Research work	3
	Compulsory reading	1
	Total hours:	150

ASSESSMENT SCHEME:

Calculation of final mark:

Individual coursework:	25 %
Group coursework:	20 %
Final exam:	35 %
Laboratory work:	20 %
TOTAL	100 %

*Las observaciones específicas sobre el sistema de evaluación serán comunicadas por escrito a los alumnos al inicio de la materia.

BIBLIOGRAPHY AND DOCUMENTATION:

Basic bibliography:

Avendaño, C. Introducción a la Química Farmacéutica. 2ª Edición. Ed. Interamericana -Mc Graw-Hill, 2001
J. A. Galbis. Panorama actual de la Química Farmacéutica. Ed. Universidad de Sevilla, 2000
Pharmaceutical chemistry: therapeutic aspects of biomacromolecules. Bladon, Christine M. Ed. John Wiley
The organic chemistry of drug design action. Second Edition. Richard B. Silverman. Ed. Elsevier

Recommended bibliography:

Gilchrist, T. L. 1995. Heterocyclic chemistry. Ed. Longman

Recommended websites: