



## 1. General information

Course: CLINICAL PHARMACY

Type: CORE COURSE

Degree: 376 - UNDERGRADUATE DEGREE PROGRAMME IN PHARMACY

Center: 14 - FACULTY OF PHARMACY

Year: 5

Main language: Spanish

Use of additional  
languages:

Web site:

Code: 14339

ECTS credits: 6

Academic year: 2022-23

Group(s): 10

Duration: First semester

Second language: English

English Friendly: Y

Bilingual: N

Lecturer: ESTHER DOMINGO CHIVA - Group(s): 10				
Building/Office	Department	Phone number	Email	Office hours
	CIENCIAS MÉDICAS		Esther.Domingo@uclm.es	
Lecturer: MARIA DEL ROCIO FERNANDEZ SANTOS - Group(s): 10				
Building/Office	Department	Phone number	Email	Office hours
Facultad de Farmacia. Despacho 3.2.	CIENCIA Y TECNOLOGÍA AGROFORESTAL Y GENÉTICA	CIENCIA Y TECNOL8296	mroci.fernandez@uclm.es	
Lecturer: CRISTINA GARCIA GOMEZ - Group(s): 10				
Building/Office	Department	Phone number	Email	Office hours
Facultad de Farmacia. Despacho de Profesores asociados clínicos.	CIENCIAS MÉDICAS	96220	cristina.gomez@uclm.es	
Lecturer: SERGIO PLATA PANIAGUA - Group(s): 10				
Building/Office	Department	Phone number	Email	Office hours
Facultad de Farmacia/2ª planta. Despacho de Profesores asociados clínicos.	CIENCIAS MÉDICAS	96220	Sergio.Plata@uclm.es	
Lecturer: JOSÉ LUIS SÁNCHEZ SERRANO - Group(s): 10				
Building/Office	Department	Phone number	Email	Office hours
Facultad de Farmacia. Despacho de Profesores asociados clínicos.	CIENCIAS MÉDICAS	96220	JoseLuis.Sanchez@uclm.es	

## 2. Pre-Requisites

It is recommended to have passed the subjects of General Pharmacology; Pharmacology and Pharmacotherapy I, Pharmacology and Pharmacotherapy II and Biopharmacy and Pharmacokinetics.

## 3. Justification in the curriculum, relation to other subjects and to the profession

The clinical pharmacy is a specialty of the Health Sciences, whose purpose is to ensure the safe and proper use of medicines in patients, through the integration of pharmacotherapeutic knowledge and analysis of the patient's clinical situation, with the support of new technologies and interacting with other health professionals.

At the end of the course, the student will be able to integrate the knowledge of pharmacology, pharmacokinetics, pharmaceutical care and communication with the patient, for a better approach to pharmacotherapeutic problems. On the other hand the student will have acquired the necessary knowledge for the management of medicines in the health environment, at the level of acquisition, selection, conditioning and dispensing of medicines. You will learn how to carry out a pharmacotherapeutic follow-up and health education to promote and guarantee the rational and safe use of medicines. You will learn the importance of applying scientific methodology to the search for pharmacotherapeutic information.

The training received will allow the student to know the management of the drug in clinical practice, developing the necessary skills for him/her future professional activity. With the general and ultimate goal of getting the student to relate the medication and its environment to the patient.

The Clinical Pharmacy completes the student's training on medication, making him competent of assuming future functions and activities. It can be integrated as an active member and of maximum effectiveness in different points of the therapeutic chain working together with the rest of health professionals for the benefit of the patient and the health system in general.

**NOTE ABOUT SOCIO-SANITARY SITUATION:** The contents and/or specific sections of this guide may be subject to modification if the social-health situation due to the pandemic requires it. In any case, students will be warned of such changes through the virtual campus. At the time of publication of the guide, all teaching possibilities are being considered (face-to-face, semi-face-to-face and/or online), which will be implemented according to the evolution of the health situation.

## 4. Degree competences achieved in this course

Course competences	
Code	Description
B01	Proficiency in a second foreign language at level B1 of the Common European Framework of Reference for Languages.
B02	Knowledge of Information and Communication Technologies (ICT).
B03	A correct oral and written communication
B04	Ethical commitment and professional deontology.
B05	Ability to develop those learning skills necessary to undertake further studies.
EM04	Study the effects of substances with pharmacological activity.
EM05	Know and understand the techniques used in the design and evaluation of pre-clinical and clinical trials.
EM06	Carry out clinical and social pharmacy activities, following the pharmaceutical care cycle.
EM07	Promote the rational use of medicines and health products.
EM08	Acquire the necessary skills to provide therapeutic advices in pharmacology and dietetics, as well as to give nutritional advice to the users of the establishment where they provide customer service
EM13	Know and understand the structure and function of the human body, as well as the general mechanisms of disease, molecular, structural and functional alterations, syndromic expression and therapeutic tools to restore health.
EM22	Interaction of drugs with other drugs or substances. Prevention and treatment.
G01	Identify, design, obtain, analyze, control and produce drugs and medicines, as well as other products and raw materials of sanitary interest for human or veterinary use.
G02	Evaluate the therapeutic and toxic effects of substances with pharmacological activity.
G03	Know how to apply the scientific method and acquire skills in the handling of legislation, sources of information, bibliography, elaboration of protocols and other aspects considered necessary for the design and critical evaluation of preclinical and clinical trials.

G04	Design, prepare, supply and dispense medicines and other products of health interest.
G05	Provide therapeutic advice in pharmacotherapy and dietotherapy, as well as in the nutritional and food field in the establishments where they provide services.
G06	Promote the rational use of medicines and medical devices, as well as to acquire basic knowledge in clinical management, health economics and the efficient use of health resources.
G07	Identify, evaluate and assess problems related to drugs and medicines, as well as participate in pharmacovigilance activities.
G08	Conducting clinical and social pharmacy activities, following the pharmaceutical care cycle.
G09	Intervene in health promotion and disease prevention activities at the individual, family and community levels, with an integral and multi-professional vision of the health-disease process.
G10	Design, apply and evaluate clinical reagents, methods and analytical techniques, knowing the basic principles of clinical analysis and the characteristics and contents of laboratory diagnostic reports.
G11	Evaluate the toxicological effects of substances and design and apply appropriate tests and trials.
G12	Develop hygienic-sanitary analyses, especially those related to food and environment.
G13	Develop communication and information skills, both oral and written, to deal with patients and users of the centre where they carry out their professional activity. Promote the capacity to work and collaborate with multidisciplinary teams and those related to other health professionals.
G14	Know the ethical and deontological principles according to the legislative, regulatory and administrative provisions governing professional practice, understanding the ethical implications of health in a changing social context.
G15	Recognise own limitations and the need to maintain and update professional competence, with particular emphasis on self-learning of new knowledge based on scientific evidence.
T01	Critical thinking skills based on the application of the scientific method
T02	Ability to manage quality scientific information, bibliography, specialized databases and resources accessible through the Internet.
T03	Handling of basic and specific software for the treatment of information and experimental results.
T04	Motivation for quality, safety at work and awareness of environmental issues, with knowledge of the internationally recognised systems for the correct management of these aspects.
T05	Organizational, planning and implementation skills.
T06	Ability to address human resources decision-making and management.
T07	Ability to work as a team and, where appropriate, exercise leadership functions, encouraging entrepreneurship.
T08	Develop interpersonal skills and the ability to function in an international and multicultural context.

## 5. Objectives or Learning Outcomes

### Course learning outcomes

#### Description

Act in accordance with ethical and deontological principles.

Develop protocols for the use of medicines and therapeutic audits.

Communicate and educate the patient on the rational use of medications to ensure compliance with treatment, as well as advise other healthcare professionals on the proper administration and use of medications.

Capacity for self-criticism.

Know how to work in a group.

Carry out a correct pharmacotherapeutic follow-up.

Participate in medication-based adverse event notification and prevention (AAM) programs.

Concern for quality.

Professional ethics and creativity.

Express themselves orally and in writing in an appropriate manner and adapted to health terminology.

To train other health professionals in pharmaceuticals.

## 6. Units / Contents

**Unit 1: Introduction to the clinical pharmacy.**

**Unit 2: Drug dispensing and distribution systems.**

**Unit 3: Pharmacoeconomics. Economic and logistical management of a hospital pharmacy department.**

**Unit 4: Clinical trials.**

**Unit 5: Pharmacoevidence. Studies on the use of medicines.**

**Unit 6: Selection of medicines. Commissions. Pharmacotherapeutic guide.**

**Unit 7: Pharmacovigilance.**

**Unit 8: Artificial nutrition.**

**Unit 9: Pharmacokinetics and clinical pharmacogenetics.**

**Unit 10: Clinical pharmacy in renal insufficiency and hepatic insufficiency patient.**

**Unit 11: Monitoring and validation of pharmacological therapy.**

**Unit 12: Clinical pharmacy in geriatrics and pediatrics.**

**Unit 13: Outpatient pharmaceutical hospital care. Hospital dispensing medication.**

**Unit 14: Clinical Pharmacy in HIV, hepatitis virus B and C.**

**Unit 15: Clinical pharmacy in multiple sclerosis and other highly complex diseases treated in hospitals.**

**Unit 16: Clinical pharmacy in critical and emergency units.**

**Unit 17: Fluidtherapy**

**Unit 18: Anti-infective pharmacotherapy. Antibiotic policy.**

**Unit 19: Sterile Pharmacotechnics. Intravenous mixtures, Plasma-derived biological medicines and advanced therapy.**

**Unit 20: Clinical pharmacy in immune-mediated diseases.**

**Unit 21: Quality and safety in drug utilization. Medication errors.**

**Unit 22: Clinical pharmacy in rare diseases. Orphan drugs.**

## ADDITIONAL COMMENTS, REMARKS

PRACTICAL PROGRAMME (5 SESSIONS: 20 HOURS)

Clinical pharmacy developed in a practical way through clinical cases of multi-pathological patients.

Practical cases of outpatient pharmaceutical care. Clinical interview. Roll play. Evaluation by simulation of a practical case.

The material provided in class by the teacher is the teacher's intellectual material and therefore may not be distributed by the student. Likewise, it is not permitted to record the classes without permission from the teacher.

## 7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
							Face-to-face teaching where different teaching methodologies are combined Exhibition Method / Master Lesson with case studies. Students will be provided with the

Class Attendance (theory) [ON-SITE]	Combination of methods	B01 B02 B03 B04 B05 EM04 EM05 EM06 EM07 EM08 EM13 EM22 G01 G02 G03 G04 G05 G06 G07 G08 G09 G10 G11 G12 G13 G14 G15 T01 T02 T03 T04 T05 T06 T07 T08	1.44	36	Y	N	necessary didactic material to follow the subject in the form of PowerPoint presentations, collections of notes and relationships of activities that will be accessible in Virtual Campus. They will also be informed of the most appropriate bibliography in each case. The active participation of the student will be encouraged, through individual and cooperative work, both in the classroom and outside it, especially in the resolution of problems and the realization of works and exhibitions, which will be taken into account in the final assessment of the subject.
Class Attendance (practical) [ON-SITE]	Practical or hands-on activities	B01 B02 B03 B04 B05 EM04 EM05 EM06 EM07 EM08 EM13 EM22 G01 G02 G03 G04 G05 G06 G07 G08 G09 G10 G11 G12 G13 G14 G15 T01 T02 T03 T04 T05 T06 T07 T08	0.8	20	Y	Y	Practical teaching will be taught in small groups within periods established in the academic calendar and will not coincide with other teaching activities. They will be carried out in the computer room where the resolution of problems will be worked through practical cases; as well as in the simulated classroom where workshops and seminars will be held to simulate practical cases of clinical interviews with patients. The classrooms will all be equipped with the appropriate means to achieve the proposed objectives. They are COMPULSORY activities so that the student will not be able to pass the subject if he does not perform them properly. At the end of the internship period, the student must submit an internship notebook with the resolution of the proposed cases.
Study and Exam Preparation [OFF-SITE]	Self-study	B01 B02 B03 B04 B05 EM04 EM05 EM06 EM07 EM08 EM13 EM22 G01 G02 G03 G04 G05 G06 G07 G08 G09 G10 G11 G12 G13 G14 G15 T01 T02 T03 T04 T05 T06 T07 T08	3.6	90	Y	N	To facilitate autonomous work, the student may request personal tutorials on the contents of the subject by arranging an interview with the teacher in advance.
Formative Assessment [ON-SITE]	Assessment tests	EM04 EM05 EM06 EM07 EM08 EM13 EM22 G15 T01	0.16	4	Y	Y	Specific dates have been set aside in the academic calendar specific dates have been set aside in the so that the assessment tests do not assessment tests do not coincide with other teaching activities.
Total:			6	150			
Total credits of in-class work: 2.4				Total class time hours: 60			
Total credits of out of class work: 3.6				Total hours of out of class work: 90			

As: Assessable training activity

Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System			
Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Test	70.00%	70.00%	Both the theoretical knowledge and the application of the same to the resolution of problems and practical cases are evaluated.
Assessment of problem solving and/or case studies	20.00%	20.00%	Attendance at practical classes is compulsory. The practices are mandatory activities that cannot be recovered, so that the existence of a fault without adequate justification will imply that the student WILL NOT BE ABLE to pass the subject. To pass the practical part, 8% will be evaluated through one or more tests carried out during the practices and the remaining 12% will be valued with the review of the practice notebook. Attendance as well as the mark obtained will be retained for the following two academic years.
Assessment of active participation	10.00%	10.00%	The resolution of problems and activities proposed in class is valued, as well as the participation in the seminars and presentation of works. The proposed activities will be available on the virtual campus. The mark obtained will be kept during the following two academic years.
<b>Total:</b>	<b>100.00%</b>	<b>100.00%</b>	

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject, an ordinary and an extraordinary one (evaluating 100% of the competences).

#### Evaluation criteria for the final exam:

##### Continuous assessment:

It will be assumed that all students opt for the continuous mode, unless otherwise informed (non-continuous mode) by e-mail to the lecturer responsible for the subject until 50% of all assessable activities have been completed or the class period has ended.

To pass the course, students must obtain a minimum mark of 4 in the THEORETICAL AND/OR PRACTICAL MODULES, if they obtain a final mark of at least 5 in the average evaluation between the theoretical and practical tests and the evaluation of participation and use in class.

EVALUATION THEORETICAL MODULE. 70% of the final grade. It will consist of ONE PARTIAL TEST (continuous evaluation) approximately when half of the syllabus has been taught, and ONE FINAL TEST IN ORDINARY CONVOCATORY (at the end of the semester), both tests may include theoretical concepts, case studies, problems, etc. Students will be able to take the FINAL TEST in the ORDINARY CONVOCATORY only with the subject matter pending evaluation as long as they have obtained a minimum grade of 4 in the PARTIAL TEST. Otherwise, they will have to take the ORDINARY CONVOCATORY WITH THE COMPLETE Syllabus. The student will pass if the minimum grade obtained in the theoretical module is a 4 and the final average grade of evaluation of all the modules is a 5.

EVALUATION OF THE PRACTICAL MODULE. 20% of the final grade. The student must obtain a minimum mark of 4 in the practical module to be able to average it with the rest of the evaluable activities of the subject. The grade obtained in the practical module will be retained for the following two academic years.

EVALUATION OF THE ACTIVITIES MODULE. 10% of the final grade. It will be assessed in the classroom by means of activities proposed by the teacher on the virtual campus. They are NOT COMPULSORY. The grade obtained in the activity module will be retained for the following two academic years.

NOTE ABOUT SOCIO-SANITARY SITUATION: The contents and/or specific sections of this guide may be subject to modification if the social-health situation due to the pandemic requires it. In any case, students will be warned of such changes through the virtual campus. At the time of publication of the guide, all teaching possibilities are being considered (face-to-face, semi-face-to-face and/or online), which will be implemented according to the evolution of the health situation.

In accordance with the provisions of article 8 of the Student Assessment Regulations, the test in which fraud has been detected will be considered invalid and will be graded with a failure (0), including any type of plagiarism detected as a fraudulent act.

#### Non-continuous evaluation:

To pass the course, students must obtain a minimum mark of 4 in the THEORETICAL AND/OR PRACTICAL MODULES, if they obtain a final mark of at least 5 in the average evaluation between the theoretical and practical tests and the evaluation of participation proposed by the teachers in virtual campus.

EVALUATION OF THE THEORETICAL MODULE. 70% of the final grade. It will consist of FINAL EXAM IN ORDINARY SESSION (at the end of the semester), the exam may include theoretical concepts, practical cases, problems. If the minimum mark obtained is a 4 and the final average mark for the assessment of all the modules is 5.

PRACTICAL MODULE EVALUATION: 20% of the final grade. The attendance to practices is COMPULSORY. Once the module has been passed, (at LEAST 4 POINTS must be obtained). If the minimum mark obtained is a 4 and the final average mark for the assessment of all the modules is 5. The grade obtained in the practical module will be retained for the following two academic years.

EVALUATION OF ACTIVITIES MODULE: 10% of the final grade. Its evaluation will consist through the realization of activities proposed by the teacher. They have a NON-COMPULSORY character. The grade obtained in the activity module will be retained for the following two academic years.

NOTE ABOUT SOCIO-SANITARY SITUATION: The contents and/or specific sections of this guide may be subject to modification if the social-health situation due to the pandemic requires it. In any case, students will be warned of such changes through the virtual campus. At the time of publication of the guide, all teaching possibilities are being considered (face-to-face, semi-face-to-face and/or online), which will be implemented according to the evolution of the health situation.

In accordance with the provisions of article 8 of the Student Assessment Regulations, the test in which fraud has been detected will be considered invalid and will be graded with a failure (0), including any type of plagiarism detected as a fraudulent act.

#### Specifications for the resit/retake exam:

##### CONTINUOUS ASSESSMENT.

It will be assumed that all students opt for the continuous mode, unless otherwise informed (non-continuous mode) by e-mail to the lecturer responsible for the subject until 50% of all assessable activities have been completed or the class period has ended.

EVALUATION OF THE THEORETICAL MODULE. 70% of the final grade. The student who does not pass the subject in the ordinary convocatory must take the exam in the EXTRAORDINARY CONVOCATORY with the complete syllabus, regardless of the grade obtained in the Partial Exam. It will consist of FINAL EXAM IN EXTRAORDINARY SESSION (at the end of the semester), the exam may include theoretical concepts, practical cases, problems. If the minimum mark obtained is a 4 and the final average mark for the assessment of all the modules is 5.

PRACTICAL MODULE EVALUATION: 20% of the final grade. The attendance to practices is COMPULSORY. Once the module has been passed, (at LEAST 4 POINTS must be obtained). If the minimum mark obtained is a 4 and the final average mark for the assessment of all the modules is 5. The grade obtained in the practical module will be retained for the following two academic years.

EVALUATION OF ACTIVITIES MODULE: 10% of the final grade. Its evaluation will consist through the realization of activities proposed by the teacher. They have a NON-COMPULSORY character. The grade obtained in the activity module will be retained for the following two academic years.

##### NON-CONTINUOUS ASSESSMENT.

EVALUATION OF THE THEORETICAL MODULE. 70% of the final grade. It will consist of FINAL EXAM IN EXTRAORDINARY SESSION (at the end of the semester), the exam may include theoretical concepts, practical cases, problems. If the minimum mark obtained is a 4 and the final average mark for the assessment of all the modules is 5.

PRACTICAL MODULE EVALUATION: 20% of the final grade. The attendance to practices is COMPULSORY. Once the module has been passed, (at LEAST 4 POINTS must be obtained). If the minimum mark obtained is a 4 and the final average mark for the assessment of all the modules is 5. The grade obtained in the practical module will be retained for the following two academic years.

EVALUATION OF THE ACTIVITIES MODULE. 10% of the final grade. It will be assessed in the classroom by means of activities proposed by the teacher on the virtual campus. They are NOT COMPULSORY. The grade obtained in the activity module will be retained for the following two academic years.

NOTE ABOUT SOCIO-SANITARY SITUATION: The contents and/or specific sections of this guide may be subject to modification if the socio-health situation due to the pandemic requires it. In any case, students will be warned of such changes through the virtual campus. At the time of publication of the guide, all teaching possibilities are being considered (face-to-face, semi-face-to-face and/or online), which will be implemented according to the evolution of the health situation.

In accordance with the provisions of article 8 of the Student Assessment Regulations, the test in which fraud has been detected will be considered invalid and will be graded with a failure (0), including any type of plagiarism detected as a fraudulent act.

#### Specifications for the second resit / retake exam:

Only students who meet the requirements set out in the Student Assessment Regulations of the University of Castilla-La Mancha will be able to access this call.

In accordance with the provisions of article 8 of the Student Assessment Regulations, the test in which fraud has been detected will be considered invalid and will be graded with a failure (0), including any type of plagiarism detected as a fraudulent act.

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours
Class Attendance (theory) [PRESENCIAL][Combination of methods]	36
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	20
Study and Exam Preparation [AUTÓNOMA][Self-study]	90
Formative Assessment [PRESENCIAL][Assessment tests]	4
Global activity	
Activities	hours
Class Attendance (theory) [PRESENCIAL][Combination of methods]	36
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	20
Study and Exam Preparation [AUTÓNOMA][Self-study]	90
Formative Assessment [PRESENCIAL][Assessment tests]	4
	<b>Total horas: 150</b>

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Lawrence A Trissel FASHP	Handbook on Injectable Drugs 18th Edition	American Society of Health System Pharmacy		978-1585283781	2017	
Brayfield, A.	Martindale: The complete drug reference.	Alison Brayfield.		978-0857113092	2017	
Di Piro JT, et al.	Pharmacotherapy a Pathopsycologic Approach.	McGraw-Hill.		978-1-260-11682	2019	
Lorenzo-Velázquez, B. (1901-1985)	Farmacología básica y clínica	Editorial Médica Panamericana		978-84-9835-168-2	2017	19 Ed.
	Catálogo del consejo general de colegios de farmacéuticos.	CGCOF.			2020	
						El resto de bibliografía se

