Teaching guide

IDENTIFICATION DETAILS

Degree:	Pharmacy
Scope	Pharmacy
Faculty/School:	Experimental Sciences
Course:	PHARMACEUTICAL TECHNOLOGY II
Type:	Compulsory
ECTS credits:	6
Year:	4
Code:	2549
Teaching period:	Eighth semester
Subject:	Pharmaceutical Technology
Module:	Pharmacy and Technology
Teaching type:	Classroom-based
Language:	Spanish
Total number of student study hours:	150

SUBJECT DESCRIPTION

Pharmaceutical Technology is the part of Pharmaceutical Sciences that is responsible for the study of technological operations, of the components involved in the manufacture of drugs, as well as for the knowledge and practical application of the rules for the correct preparation of drugs, master formulas and official preparations.

In this second part of the course, the processes of preformulation, formulation and evaluation of the rest of the pharmaceutical forms not treated in the subject Pharmaceutical Technology I, new controlled release pharmaceutical forms, medical devices and drug stability studies will be explored in depth.

GOAL

Establish the procedures involved in the design, formulation, manufacture, packaging and control of pharmaceutical forms, both at the office and industrial levels, and analyze the evolving role of the pharmacist in the design of new drugs.

PRIOR KNOWLEDGE

The contents of the basic and compulsory subjects of the first three years of the degree, as well as the knowledge taught in the first part of the course Pharmaceutical Technology I.

COURSE SYLLABUS

THEORETICAL PROGRAM:

BLOCK I: FUNDAMENTAL ASPECTS OF DISPERSED SYSTEMS.

Topic 1. FUNDAMENTAL ASPECTS OF HOMOGENEOUS DISPERSED SYSTEMS: SOLUTIONS.
Theme 2. BASIC OPERATIONS IN SOLUTION PREPARATION: FILTRATION.
Theme 3. FUNDAMENTAL ASPECTS OF HETEROGENEOUS DISPERSED SYSTEMS: EMULSIONS AND SUSPENSIONS.

BLOCK II: CONVENTIONAL PHARMACEUTICAL FORMS.

Topic 4. ORAL LIQUID FORMS: ORAL SOLUTIONS, SUSPENSIONS AND EMULSIONS.
Topic 5. FATTY SEMI-SOLID FORMS: OINTMENTS, CREAMS AND PASTES.
Theme 6. HYDROPHILIC SEMI-SOLID FORMS: GELS AND LOTIONS.
Topic 7. RECTAL AND VAGINAL FORMS.
Topic 8. NASAL, OTIC AND OPHTHALMIC FORMS.
Topic 9. PHARMACEUTICAL SPRAYS.

BLOCK III: MODIFIED-RELEASE PHARMACEUTICAL FORMS. NEW PERSPECTIVE ON THE DESIGN OF PHARMACEUTICAL FORMS.

Topic 10. MODIFIED-RELEASE PHARMACEUTICAL FORMS.
Topic 11. A LOOK INTO THE FUTURE IN THE DESIGN OF PHARMACEUTICAL FORMS.
Topic 12. PHARMACEUTICALS AND MEDICINES: HISTORICAL, ETHICAL AND SOCIAL PERSPECTIVE.

BLOCK IV: STABILITY, OTHER DRUGS AND MEDICAL DEVICES.

Topic 13. DRUG STABILITY.
Topic 14. SPECIAL, GENERIC, ADVERTISING AND ORPHAN DRUGS.
Topic 15. MEDICAL DEVICES.

PRACTICAL PROGRAM: Some of the pharmaceutical forms developed throughout the theoretical program of the subject will be prepared in the laboratory, such as syrups, suppositories or gels, and their quality controls will be carried out throughout their formulation and in the finished product.

EDUCATION ACTIVITIES

THEORY CLASSES (AFP1): theoretical content will be taught and will be complemented by interactive audiovisual material and documentation provided through the virtual classroom of the subject.
PRACTICAL CLASSES (AFP2): Students will carry out experimental work in the teaching laboratory guided by the teacher following the internship script that they will have previously available.
EXERCISE AND PROBLEM CLASSES (AFP3): explanation of the methodology for solving exercises and the student will be guided in preparing the work required by the teacher.
SEMINARS AND/OR EXHIBITION OF WORKS (AFP4): exercises, problems and a work will be proposed through the virtual classroom, which complement the theoretical contents taught.
TUTORING (AFP5): individual and/or group to monitor the evolution of learning and guide students throughout the development of the subject.
TAKING EXAMS (AFP6): students will be examined both the theoretical contents and the practical contents developed in the practice sessions.
The Virtual Classroom platform will be very useful for the study of the subject and for effective communication between student-teacher and student-student. In the Virtual Classroom, students will have basic information and material and support for classes to promote the study of the subject. It will also allow the submission of scheduled exercises and activities, solved individually and/or in groups.

DISTRIBUTION OF WORK TIME

TEACHER-LED TRAINING ACTIVITIES	INDIVIDUAL WORK
65 Horas	85 Horas

LEARNING RESULTS

Design, optimize and develop pharmaceutical forms while ensuring their quality, including the formulation and quality control of drugs, the development of master formulas and official preparations.

Apply quality control of medical, dermopharmaceutical and cosmetic products and packaging materials.

Know the physico-chemical and biopharmaceutical properties of the active ingredients and excipients as well as the possible interactions between the two.

Know the stability of active ingredients and pharmaceutical forms as well as the methods of study.

Know the basic operations and technological processes related to the development and control of medicines.

SPECIFIC LEARNING RESULTS

List and plan the technological operations and materials involved in the manufacture and packaging of drugs.

Estimate the basic operations necessary to adapt the raw material of medicines, as well as the transformation operations required for their conversion into intermediate products used for the manufacture of medicines.

Describe and interpret control tests for drugs and packaging materials.

Analyze and evaluate the role of the pharmacist in the design and development of drugs from a historical, ethical and social perspective||Design pharmaceutical forms appropriately, taking into account the physico-chemical and biopharmaceutical properties of the active ingredient and excipients, in order to achieve an effective and safe therapeutic response of the drug.

LEARNING APPRAISAL SYSTEM

The CONTINUOUS EVALUATION system will take into consideration:

Written or oral, developmental, short answer or test-type tests (SE1): 50%
Daily activities and exercises (SE2): 10%
Individual and group work (SE3): 23%
Attendance and participation in face-to-face classroom activities (SE4): 2%
Attendance and participation in face-to-face activities in the laboratory (SE8): 15%

- WRITTEN DEVELOPMENT TEST, SHORT ANSWER OR TEST TYPE (SE1): in the corresponding ordinary call, the theoretical exam will be held, where the knowledge acquired during the course will be evaluated. It is an essential requirement to pass the course to obtain a minimum grade of 5.0 in this evaluation section.
- DAILY ACTIVITIES AND EXERCISES (SE2): activities and exercises will be carried out in the classroom or autonomously that will complement the contents of the exhibition sessions.
- INDIVIDUAL AND GROUP WORK (SE3): students must complete individually or as a group a series of exercises/problems proposed as seminars through the virtual classroom.
- ATTENDANCE AND PARTICIPATION IN FACE-TO-FACE ACTIVITIES IN THE CLASSROOM (SE4): regular attendance and participation checks will be carried out. Proof of non-attendance will not be accepted except in very exceptional cases.
- ATTENDANCE AND PARTICIPATION IN FACE-TO-FACE ACTIVITIES IN THE LABORATORY (SE5): It is an essential requirement to pass the course to obtain a minimum score of 5.0 in this evaluation section. Attendance at all practical sessions (regardless of where they take place: laboratory, computer rooms, simulation tunnel, etc.) is mandatory. The unjustified absence of any of these sessions leads to the loss of the right to an internship evaluation in the ordinary call and a suspension of the course.

ALTERNATIVE EVALUATION SYSTEM FOR 2ND OR SUBSEQUENT ENROLLMENT STUDENTS will take into

consideration:

Written or oral, developmental, short answer or test-type tests (SE1): 50%
Daily activities and exercises (SE2): 5%
Individual work (SE3): 23%
Attendance at two mandatory follow-up tutoring sessions with the teacher: 7%
Attendance and participation in face-to-face activities in the laboratory (SE8): 15%

Students in second or subsequent enrollment must contact the teacher to request to take advantage of this system.
Passing the subject: to consider the theory (theory exam) and practice (laboratory practice exam) parts for the calculation of the final grade, each of them must be approved. The course is approved with a grade equal to or greater than 5.0. If the theory part is passed but not the practical part, the score of the theoretical exam will be kept until the extraordinary call. The same will happen if the practical part is approved but not the theoretical part. The grades obtained from the submissions of papers, attendance and face-to-face activities in the classroom will also be kept in the extraordinary call.
*'Plagiarism, as well as the use of illegitimate means in evaluation tests, will be sanctioned in accordance with those established in the Evaluation Regulations and the University's Coexistence Regulations."

ETHICAL AND RESPONSIBLE USE OF ARTIFICIAL INTELLIGENCE

1.- The use of any Artificial Intelligence (AI) system or service shall be determined by the lecturer, and may only be used in the manner and under the conditions indicated by them. In all cases, its use must comply with the following principles:
a) The use of AI systems or services must be accompanied by critical reflection on the part of the student regarding their impact and/or limitations in the development of the assigned task or project.
b) The selection of AI systems or services must be justified, explaining their advantages over other tools or methods of obtaining information. The chosen model and the version of AI used must be described in as much detail as possible.
c) The student must appropriately cite the use of AI systems or services, specifying the parts of the work where they were used and describing the creative process followed. The use of citation formats and usage examples may be consulted on the Library website(https://www.ufv.es/gestion-de-la-informacion_biblioteca/).
d) The results obtained through AI systems or services must always be verified. As the author, the student is responsible for their work and for the legitimacy of the sources used.
2.- In all cases, the use of AI systems or services must always respect the principles of responsible and ethical use upheld by the university, as outlined in the Guide for the Responsible Use of Artificial Intelligence in Studies at UFV. Additionally, the lecturer may request other types of individual commitments from the student when deemed necessary.
3.- Without prejudice to the above, in cases of doubt regarding the ethical and responsible use of any AI system or service, the lecturer may require an oral presentation of any assignment or partial submission. This oral evaluation shall take precedence over any other form of assessment outlined in the Teaching Guide. In this oral defense, the student must demonstrate knowledge of the subject, justify their decisions, and explain the development of their work.

BIBLIOGRAPHY AND OTHER RESOURCES

Basic

Ramón Martínez Pacheco (ed.). Pharmaceutical Technology Treaty/Madrid:Synthesis, 2016.

Lozano Estevan, María del Carmen. Pharmaceutical Technology Manual/Barcelona:Elsevier, 2012.