UFV

Teaching guide

IDENTIFICATION DETAILS

Degree:	Pharmacy

Scope	Pharmacy

Faculty/School:	Experimental Sciences

Course:	TOXICOLOGY

Type:	Compulsory	ECTS credits:	6

Year:	4	Code:	2540

Teaching period:	Seventh semester

Subject:	Pharmacology

Module:	Medicine and Pharmacology

Teaching type:	Classroom-based

Language:	Spanish

Total number of student study hours:	150

SUBJECT DESCRIPTION

Toxicology is the science that studies the adverse effects caused by chemical substances and certain physical and biological agents, as well as the assessment of their risk, and includes knowledge of their properties, mechanisms of action, methods of analysis and assessment of toxicity, and the study of the means to alleviate the alterations they cause. This course will address the study of agents, natural or synthetic, that can cause acute or chronic poisoning; their identification; mechanism of action, clinical or experimental diagnosis of toxicity, knowledge of residues in food products with potential risks, and environmental contaminants.

GOAL

There are currently some 345,000 products in the hands of man out of the 114 million chemical substances that have been synthesized (CAS Registry, American Chemistry Society), a number that is constantly increasing, most of them of undeniable utility and whose dangerousness we are not usually aware of. If we add the importance of dramatic poisonings, with an obvious clinical picture, and of subclinical poisonings, chronic or not, with diffuse symptoms that are difficult to diagnose, they make Toxicology an essential discipline in the experimental sciences so that they can propose a professional practice that has an impact on the guarantee of public health.

PRIOR KNOWLEDGE

For optimal use of the subject, students are recommended to have adequate knowledge of the following subjects: Biochemistry, Physiology, Pathophysiology and Pharmacology I and II.

COURSE SYLLABUS

Topic 1: INTRODUCTION TO TOXICOLOGY.

BLOCK I: TOXICITY AND RISK ASSESSMENT
Topic 2: INTRODUCTION TO TOXICITY EVALUATION.
Topic 3: ACUTE, REPEATED DOSE AND CHRONIC TOXICITY STUDIES.
Topic 4: MUTAGENESIS, CARCINOGENESIS, TERATOGENESIS AND EFFECTS ON REPRODUCTION.

BLOCK II: ANALYTICAL TOXICOLOGY
Topic 5: THE SAMPLE FOR TOXICOLOGICAL ANALYSIS.
Topic 6: EXTRACTION AND TECHNIQUES USED IN TOXICOLOGICAL ANALYSIS.

BLOCK III: TOXICOKINETICS AND TOXICODYNAMICS
Topic 7: STAGES OF THE TOXIC PHENOMENON
Topic 8: BIOTRANSFORMATION OF TOXINS.
Theme 9: TOXICODYNAMICS. MECHANISMS OF TOXICITY.

BLOCK IV: DRUG TOXICOLOGY
Topic 10: GENERAL TREATMENT OF POISONING. DRUG POISONING.
Topic 11: TOXICOLOGY OF HYPNOTIC-SEDATIVES.
Topic 12: TOXICOLOGY OF ANTIDEPRESSANTS AND NEUROLEPTICS.
Topic 13: TOXICOLOGY OF ANTICONVULSANTS.
Topic 14: TOXICOLOGY OF ANALGESICS AND NON-STEROIDAL ANTI-INFLAMMATORY DRUGS: SALICYLATES, PARACETAMOL AND NSAIDS.

Topic 15: TOXICOLOGY OF DRUGS ACTING ON THE CARDIOVASCULAR SYSTEM: DIGITALIS, ANTIARRHYTHMICS, ANTIHYPERTENSIVES, VASODILATORS.
Topic 16: TOXICOLOGY OF ANTICOAGULANT AND HYPOGLYCEMIC DRUGS.
Topic 17: TOXICOLOGY OF ANTIMICROBIALS, ANTIFUNGALS, ANTITUBERCULOUS DRUGS, AND ANTIVIRALS.
Topic 18: TOXICOLOGY OF ANTINEOPLASTIC AGENTS.

Block V: TOXICOLOGY OF OTHER XENOBIOTIC AGENTS
Topic 19: INTRODUCTION TO THE TOXICOLOGICAL STUDY OF DRUGS OF ABUSE.
Topic 20: ETHYL ALCOHOL. ALCOHOL POISONING.
Topic 21: OPIOIDS.
Topic 22: STIMULANTS: COCAINE AND AMPHETAMINES.
Theme 23: CANNABIS, HALLUCINOGENS AND DESIGNER DRUGS.
Topic 24: PESTICIDE POISONING.
Topic 25: METAL POISONING.
Topic 26: POISONING DUE TO INHALED TOXINS.
Topic 27: ENDOCRINE DISRUPTORS.
Topic 28: POISONINGS BY POISONOUS PLANTS AND ANIMALS.

LABORATORY PRACTICES Determination of the cytotoxicity of a compound by means of the MTT colorimetric assay in cell culture. Determination of certain active ingredients (AAS, BB, phenothiazines,...) in biological fluids.

EDUCATION ACTIVITIES

AFP1. Theory classes
The fundamental purpose is to provide structured information in such a way as to facilitate the understanding of the content of the subject. The most important and difficult aspects of the syllabus will be addressed, leaving for the student's personal work those that can be addressed based on the contents presented during classes. The teacher will use presentations and explanatory videos as support material during classes.
AFP2. Practical classes
Laboratory practices that allow students to directly contact the methodology for the analysis of toxins in biological fluids using simple techniques, in small groups and leading the student step by step to acquire manual skills in the laboratory.
AFP3. Exercise classes and problems
Under the supervision of the teacher, students will carry out different activities related to the subject: case analysis and problem-based learning. In addition, students will have at their disposal a self-learning platform, developed by the subject teacher himself, to deepen the contents and clarify the most important aspects of Toxicology. All of these activities will be evaluated.
AFP4. Seminars and/or exhibition of works
The students will do group work under the supervision of the teacher related to the content of the subject. This activity will also be evaluated.
AFP5. Tutorials
In person or via email or video conference, for the resolution of doubts.
AFP6. Conducting exams

AFNP1. Study of theory, exercises and problems
AFNP2. Internship preparation and study
AFNP3. Preparing jobs
AFNP4. Tutoring preparation

DISTRIBUTION OF WORK TIME

TEACHER-LED TRAINING ACTIVITIES	INDIVIDUAL WORK
64 Horas	86 Horas

Cross Skills

To nurture an attitude of intellectual curiosity and a quest for truth in all areas of life.

To be able to approach a subject by means of rigorous, profound and comprehensive thought.

To be able to assess knowledge acquired.

To be able to apply the theoretical knowledge learnt in the of solving problems and practical cases linked to the various subjects.

LEARNING RESULTS

Know the properties and mechanisms of action of drugs.

Know the nature, mechanisms of action and effect of toxic substances, as well as resources in case of poisoning.

Know the analytical techniques related to laboratory diagnostics, toxins, food and the environment.

Evaluate the toxicological effects of substances and design and apply corresponding tests and analyses.

Evaluate the effects of substances with pharmacological activity.

SPECIFIC LEARNING RESULTS

Describe the fundamentals and basic principles of Toxicology.

Describe the basic methodology for evaluating toxicity and risk.

Explain analytical techniques related to toxin analysis.

Recognize and argue the most relevant aspects of drug toxicity.

Define the nature, mechanisms of action and effect of toxicants, as well as the principles of treatment.

LEARNING APPRAISAL SYSTEM

The evaluation of the degree of achievement of the objectives and acquisition of competencies in Toxicology will be carried out in the following modalities:

Ordinary evaluation system:

1. Theory exam qualification (SE1). Written or oral, developmental, short answer or test-type tests) [60% of the final grade]

An exam will be carried out with test-type questions and short questions, based on the content of the theoretical classes. To pass the course, it will be necessary to obtain a minimum grade of 5.00 out of 10.00.

2-.Qualification of practical laboratory classes (SE8). Attendance and participation in face-to-face activities in the laboratory) [15% of the final grade]

To pass the course, it is necessary to do the internship. At the end of the internship, an evaluation test will be carried out. To pass the course, it will be necessary to obtain a minimum grade of 5.00 out of 10.00.

3. Continuous evaluation. [25% of the final grade]

It will take into account:

- IF 4. Attendance and participation in face-to-face classroom activities (5%).
- IF 2. Daily activities and exercises: self-study tasks, case analysis,... (5%).
- IF 3. Individual and group work: group project development (15%).

Alternative evaluation system; students in second or subsequent enrollment must contact the teacher to request to take advantage of this evaluation system:

1. Theory exam qualification (SE1). Written or oral, developmental, short answer or test-type tests) [60% of the final grade]

An exam will be carried out with test-type questions and short questions, based on the content of the theoretical classes. To pass the course, it will be necessary to obtain a minimum grade of 5.00 out of 10.00.

2-.Qualification of practical laboratory classes (SE8). Attendance and participation in face-to-face activities in the laboratory) [15% of the final grade]

To pass the course, it is necessary to do the internship. At the end of the internship, an evaluation test will be carried out. To pass the course, it will be necessary to obtain a minimum score of 5.00 out of 10.00.

3. Continuous evaluation. [25% of the final grade]

It will take into account:

- Attendance at tutoring and participation in activities (5%). (IF 4. Attendance and participation in face-to-face classroom activities)
- Perform the different daily activities and exercises: self-study tasks, case analysis,... (5%). (IF 2. Daily activities and exercises)
- Development of the project as a group (15%). (IF 3. Individual and group work)

TO PASS THE COURSE, IT WILL BE NECESSARY TO HAVE COMPLETED ALL THE INTERNSHIPS, OBTAIN AT LEAST 50% OF THE MAXIMUM GRADE OF THE THEORY EXAM AND THE INTERNSHIP EXAM AND OBTAIN AN OVERALL GRADE GREATER THAN OR EQUAL TO 5.

Attendance at all practical sessions 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. Students in this situation should immediately contact the subject's teachers.

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.

IN THE EXTRAORDINARY CALL, THE SAME EVALUATION SYSTEM IS MAINTAINED, KEEPING THE SCORE FOR THE THEORY EXAM, THE INTERNSHIP EXAM OR THE CONTINUOUS EVALUATION EXAM IF THEY HAVE BEEN PASSED.

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

Repetto M. Fundamental Toxicology

Klaassen, C. D. Casarett and Doull's. Foundations of Toxicology