COURSE DESCRIPTION

COURSE DETAILS

Title (of the course): **TOXICOLOGÍA ALIMENTARIA**
Code: 102235
Degree/Master: **GRADO DE CIENCIA Y TECNOLOGÍA DE LOS ALIMENTOS** Year: 3
Name of the module to which it belongs: SEGURIDAD ALIMENTARIA
Field: SEGURIDAD ALIMENTARIA
Character: OBLIGATORIA
Duration: SECOND TERM
ECTS Credits: 6
Classroom hours: 60
Face-to-face classroom percentage: 40%
Study hours: 90
Online platform:

LECTURER INFORMATION

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COURSE DESCRIPTION

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PREREQUISITES AND RECOMMENDATIONS

Prerequisites established in the study plan

None.

Recommendations

None specified.

INTENDED LEARNING OUTCOMES

CB2	Students will know how to apply their knowledge to their job or professional vocation, and will possess the knowledge that they can demonstrate by means of developing and defending arguments, and solving problems within their area of study.
CB3	To make the students able to obtain and interpret relevant data (normally within their field of study) to reflect on social, scientific and ethical topics
CB5	To make students able to develop necessary learning abilities to begin further study with a high degree of independence
CE14	To evaluate control and management strategies and plans for the prevention and control of diseases linked to food consumption.
CE3	To understand the techniques and to carry out analysis of food in order to guarantee optimal conditions for human consumption.
CE7	To analyse the biological physical and chemical dangers of the food chain in order to protect public health
CT2	Ability to resolve problems.
CT4	Ability to put knowledge into practice
CT8	To develop critical thinking.
CU2	Improving user-level skills in ICT

OBJECTIVES

1. To provide the student with the basic concepts of Toxicology
2. Acquisition of skills in the search, selection, management and Toxicology information analysis
3. To Know the mechanisms of incorporation, transformation and excretion of chemical pollutants, as well as the study of mechanisms at the molecular and cellular levels of processes Toxic; The methods used to assess toxicity
4. To Make a review of the main toxics present in food: Toxic substances of natural origin in the food; Food Additives; And toxic chemicals associated with food processing technologies

CONTENT

1. Theory contents

PART I
Topic 1 GENERAL TOXICOLOGY. Toxicology: Historical evolution. Concept and related concepts. Division of Toxicology. Food Toxicology: Concept. Dose response. Risk Assessment in Food Toxicology.
Topic 2 º Toxic components of food: natural, biological contaminants, chemicals, substances Derivatives and additives.
Topic 3º PHASES OF THE TOXIC ACTION. Toxicokinetic phase: absorption, distribution, biotransformation and excretion of toxics.
Topic 4º Toxicodynamic Phase: Mechanisms of action of toxicants. Factors that modify toxicity: intrinsic and extrinsic.
Topic 5 Aspects of the toxic action phases of special attention in Food Toxicology: Importance of the gastrointestinal tract. Food Allergies.
Topic 6º EXPERIMENTAL TOXICOLOGY: The study of toxicity. General and Specific methods. Alternative methods.
Topic 7º ANALYTICAL TOXICOLOGY. Toxicological analysis. Sampling and preparation for shipment to the laboratory. Types of food analysis. Good Laboratory Practices (GLP).
Topic 8 TOXICOLOGY OF NATURAL TOXIC COMPOUNDS IN FOODS. FOODS OF MARINE ORIGIN. Mollusc and fish poisoning. Classification. Origin. Mechanisms of action. Toxic Effects. Precautionary measures.

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COURSE DESCRIPTION

Topic 9º FOODS DERIVED FROM UPPER PLANTS. Antinutritives, antimines, Antivitamins. Other natural toxins in foods of plant origin.
Topic 10º SUPERIOR FUNGI. Toxicological risks derived from the consumption of higher fungi. Main syndromes.
Topic 11 OTHERS. New foods and functional foods: Concept and groups. Assessment of your safety.
PART II
Topic 12 TOXICOLOGY OF TOXIC COMPOUNDS DERIVED FROM THE PROCESSING, CONSERVATION AND STORAGE OF FOODS. Pyroorganic and non-pyroorganic compounds.
Topic 13 Compounds derived from heating and oxidation of fats. Nitrates, nitrites and n-nitroso compounds. 3-mcpd.
Topic 14º Compounds derived from materials in contact with food. Determinants of migration. Migration tests. Toxicological studies required on the basis of migration levels.
Topic 15 TOXICOLOGY OF TOXIC COMPOUNDS CONTAMINANTS OF FOODS. BIOTIC CONTAMINATION. Bacterial contamination. Contamination by mycotoxins: Mechanisms of action. Clinical manifestations. Prevention and methods of control of mycotoxins.
Topic 16 ABYOTIC CONTAMINATION. Toxic metallic elements and compounds. Origin and distribution in food. Toxicity and incidence.
Topic 17 Pesticides I: Insecticides. Origin and distribution in food. Toxicity and incidence.
Topic 18 Pesticides II: Herbicides and fungicides. Origin and distribution in food. Toxicity and incidence. Topic 19 Industrial Pollutants. Dioxins and related compounds. Origin and distribution in food. Toxicity and incidence.
Topic 20 General toxicological aspects of residues of veterinary drugs in food of animal origin. Topic 21 Main groups of residues of drugs in food of animal origin: Antibiotics, anabolic and beta-agonists. Topic 22 - Endocrine disruptors of interest in Food Safety.
Topic 23º PRINCIPLES AND GENERAL REQUIREMENTS OF FOOD LEGISLATION. European Food Safety Authority. Procedures relating to food safety.

2. Practical contents

- Search for toxicological information in the network.
- Good laboratory practices and Chemical safety.
- Extraction of tomato alkaloids and diagnosis by thin layer chromatography.
- Nitrites in sausages.
- Diagnosis of chemical contaminants in water
- Extraction and purification of ochratoxin A in cereals, and diagnosis by chromatographic techniques
- Determination of additives in shellfish
- Evaluation of toxicological risk of residues in food. Case study
- Determination of cyanogenic glycosides in foods of plant origin.
- Copper in food of animal origin.
- Pesticide research.
- Detection of beta-agonists by immunoassay.
- Elaboration of toxicological reports

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METHODOLOGY

General clarifications on the methodology. (optional)

It is mandatory the assistance to practices of all the students, as well as the delivery of a memory of practices
It is mandatory to carry out a work in a group that will later also be defended to the rest of companions
Particular consideration will be given to the students attending at part-time degree

Methodological adaptations for part-time students and students with disabilities and special educational needs

Particular consideration will be given to the students attending at part-time degree

Face-to-face activities

Activity	Large group	Medium group	Total
Assessment activities	2	-	*2*
Conference	1	-	*1*
Group presentation	3	-	*3*
Lab practice	-	19	*19*
Lectures	33	-	*33*
Seminar	-	2	*2*
Total hours:	***39***	***21***	***60***

COURSE DESCRIPTION

Off-site activities

Activity	Total
Group work	*10*
Information search	*5*
Reference search	*5*
Self-study	*70*
Total hours:	**90**

WORK MATERIALS FOR STUDENTS

Coursebook
Oral presentations
References
Lessons summary

EVALUATION

Intended learnig outcomes	Tools		
	Exams	Oral presentation	Placement reports
CB2	x		
CB3	x		
CB5	x		x
CE14	x		x
CE3			x
CE7	x	x	x
CT2			x
CT4			x
CT8	x	x	
CU2		x	
Total (100%)	**70%**	**20%**	**10%**
Minimum grade.(*)	**5**	**5**	**5**

(*) Minimum grade necessary to pass the course

Method of assessment of attendance:

Once the subject has been exceeded, the final qualification could be increased up to 10%, percentage that will be proportional to the number of classes attended

General clarifications on instruments for evaluation:
It is mandatory the assistance to practices of all the students, as well as the delivery of a memory of practices. Non-attendance at practical sessions will involve conducting a practical examination
It is mandatory to carry out a work in a group that will later also be defended to the rest of companions
The test will consist be divided in two parts (test-type part and short-answer questions). Students should get at least a 5 in each part of the exam.
The total value of the test is 70% of the final qualification

Clarifications on the methodology for part-time students and students with disabilities and special educational needs:
Special considerations will be established at the beginning of the course

COURSE DESCRIPTION

Qualifying criteria for obtaining honors: *They will be selected among the students with the best overall qualifications, obtaining a minimum of 9*

BIBLIOGRAPHY

1. Basic Bibliography:

1. Bibliografía básica:
Altug, T. "Introduction to Toxicology and Food". CRC PRESS, Boca Raton (Florida). 2003
Cameán, A. y Repetto, M. "Toxicología alimentaria". Díaz de Santos, Madrid. 2006
Calvo Carrillo, MC & Mendoza Martínez E. "Toxicología de los Alimentos". McGrawHill (Mexico). 2012
Food Research Institute. "Food Safety". Marcel Dekker, Inc., NY. 1993
Losada, S. "La gestión dela Seguridad alimentaria". Ariel, S.A., Barcelona. 2001
Nebbia, C. "Residui farmaci e contaminanti ambientali nelle produzioni animali". Edises, Torino, 2008.
Püssa Toñu. "Principles of Food Toxicology". CRC PRess, 2014
Repetto, M y Repetto G. Toxicología Fundamental. 4ª ed. Díaz de Santos. 2009
Watson, D.H. "Food chemical safety". CRC, Cambridge England. 2001.

2. Further reading:

D´Mello J.P.F. "Food Safety: Contaminants and Toxins". Ed. J.P.F. D´Mello. Edinburgh. 2003
Hamiltons D. and Crossleys S. "Pesticide Residues in Food and Drinking Water: Human exposure and Risks". Wiley, 2004
Siantar DP. Trucksess MW, Scott PM. "Food Contaminants: mycotoxins and food allergens". American Chemical Society, 2008
Watson, DH. "Pesticide, veterinary and other residues in food". CRC, Cambridge England. 2004
Wood, R. "Analytical methods for food additives". Woodhead Publishing Limited,Cambridge England. 2004
http://ec.europa.eu/food/food/index_es.htm
http://www.aecosan.msssi.gob.es
http://www.efsa.europa.eu/

COORDINATION CRITERIA

- Common evaluation criteria
- Common learning outcomes
- Joint activities: lectures, seminars, visits ...
- Tasks deadlines

SCHEDULE

Period	Activity					
	Assessment activities	Conference	Group presentation	Lab practice	Lectures	Seminar
1# Fortnight	0	0	0	0	5	0
2# Fortnight	0	0	0	4	5	0
3# Fortnight	0	0	0	3	5	2
4# Fortnight	0	0	0	4	5	0
5# Fortnight	0	0	0	4	5	0
6# Fortnight	0	0	0	4	5	0
7# Fortnight	0	1	0	0	3	0
8# Fortnight	2	0	3	0	0	0
Total hours:	***2***	***1***	***3***	***19***	***33***	***2***

The methodological strategies and the evaluation system contemplated in this Course Description will be adapted according to the needs presented by students with disabilities and special educational needs in the cases that are required.

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