UNIVERSIDAD DE CASTILLA - LA MANCHA

GUÍA DOCENTE

1. General information

Course: RESEARCH IN TOXICOLOGY APPLIED TO WILDLIFE
Code: 310053
Type: CORE COURSE
ECTS credits: 6
Degree: 2310 - MASTERS DEGREE PROGRAMME IN BASIC AND APPLIED RESEARCH IN HUNTING RESOURCES
Academic year: 2019-20
Center: 601 - E.T.S. AGRICULTURAL ENGINEERS AND MOUNTS AB
Group(s): 20
Year: Sin asignar
Duration: First semester
Main language: Spanish
Second language: English
Use of additional languages:
English Friendly: Y
Web site:
Bilingual: N

Lecturer: **RAFAEL MATEO SORIA** - Group(s): **20**

Building/Office	Department	Phone number	Email	Office hours
IREC	CIENCIA Y TECNOLOGÍA AGROFORESTAL Y GENÉTICA	926052758	rafael.mateo@uclm.es	9:30-12:30

Lecturer: **Mª DOLORS VIDAL ROIG** - Group(s): **20**

Building/Office	Department	Phone number	Email	Office hours
Facultad de Medicina/1.31	CIENCIAS MÉDICAS	92629530 ext.3386	mariadolors.vidal@uclm.es	Jueves de 15:30 a 17:30

2. Pre-Requisites

Those general pre-requisites of the Máster. Course special interest for graduates in Chemistry, as well as other established for the Master.

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

The studies are planned to form the student in wildlife toxicology, giving the necessary knowledge in this subject to develop the research tasks.

4. Degree competences achieved in this course

Course competences

Code	Description
E01	
E02	
E04	
E05	
E06	
E07	
E08	
G01	
G02	
G04	
G05	
G06	
G07	
G08	
G09	
G10	

5. Objectives or Learning Outcomes

Course learning outcomes

Description

6. Units / Contents

Unit 1: Introduction to toxicology: Definition and types of toxic. Dose-response relationship: types of toxicity. Routes of exposure. Absorption. Metabolism. Excretion. Toxicokinetics Bioaccumulation and biomagnification.

Unit 2: Biomarkers Definition of biomarker. Biomarkers of effect and exposure. Types of biomarkers of effect: specific and general.

Unit 3: Analytical techniques in toxicology: extraction and purification of organic and inorganic compounds, chromatography, UV-Vis spectrophotometry, absorption and atomic emission, mass spectrometry.

Unit 4: Agricultural management and biodiversity conservation. Indirect effects of pesticides. Population trends of wild birds.

Unit 5: Direct effects of agrochemicals. Pesticides: anticholinesterase insecticides, anticoagulant rodenticides, fungicides and herbicides. Fertilizers: Nitrates.

Unit 6: Problem of the use of poison. Origin, types of poison, diagnosis, actions.

Unit 7: Persistent organic pollutants Organochlorine pesticides. PCBs. Dioxins and furans. Endocrine disruption

Unit 8: Emerging contaminants: diphenyl polybrominated, polyfluorinated, nanomaterial ethers.

Unit 9: Oil pollution in the marine environment. Polycyclic aromatic hydrocarbons. Adverse effects in seabirds.

Unit 10: Plumbing in wild birds. Exhibition in waterfowl, land and raptors. Adverse effects of lead. Alternatives to lead ammunition.

Unit 11: Contamination by other heavy metals and metalloids: mercury, cadmium, arsenic, selenium.

Unit 12: Veterinary drugs: adverse effects on scavenger species. Diclofenac in Asian vultures, other anti-inflammatories and antibiotics.

Unit 13: Toxins Toxiinfections food. Botulism. Cyanobacterial toxins: microcystins and other types. Mycotoxins

Unit 14: Biomarkers Determination of cerebral acetylcholinesterase activity in animals exposed to organophosphates and carbamates. In vitro reactivation techniques of enzymatic activity.

Unit 15: Analytical Toxicology Analysis of pesticides and poisons: solvent extraction, purification by gel permeation chromatography and analysis by gas chromatography coupled to mass spectrometry.

Unit 16: Analytical toxicology: Determination of anticoagulant rodenticides

Unit 17: Analytical Toxicology Heavy metal analysis: microwave oven digestion and atomic absorption analysis in graphite chamber.

Unit 18: Field study

Unit 19: Experimental design.

Unit 20: Self Learning and Evaluation

7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	R	Description
Class Attendance (theory) [ON-SITE]	Lectures	E01 E02 G01 G04 G08	0.8	20	Y	Y	Y	
Laboratory practice or sessions [ON-SITE]	Practical or hands-on activities	E04 E05 G01 G04 G08	0.8	20	Y	Y	Y	
In-class Debates and forums [ON-SITE]	project-based learning	E02 G02 G04 G05	0.06	1.5	Y	N	Y	
Writing of reports or projects [OFF-SITE]	Reading and Analysis of Reviews and Articles	E01 E02 E06 G01 G04 G08	1.2	30	Y	N	Y	
Group tutoring sessions [ON-SITE]	Group tutoring sessions	E08 G04 G06 G09	0.2	5	Y	N	Y	
Writing of reports or projects [OFF-SITE]	Project/Problem Based Learning (PBL)	E02 E06 E07 G02 G05 G08	1.2	30	Y	N	Y	
Problem solving and/or case studies [ON-SITE]	Group Work	E02 E06 E07 G01 G02 G04 G05 G06 G07 G08 G09 G10	0.5	12.5	Y	N	Y	
Study and Exam Preparation [OFF-SITE]	Self-study	E02 E04 E06 G01 G04 G08	1.2	30	Y	N	Y	
Final test [ON-SITE]	Problem solving and exercises	E01 E02 E04 E05 E06 E07 E08 G01 G02 G04 G05 G06 G07 G08 G09 G10	0.04	1	Y	N	Y	
		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
R: Rescheduling training activity

8. Evaluation criteria and Grading System

	Grading System		
Evaluation System	**Face-to-Face**	**Self-Study Student**	**Description**
Oral presentations assessment	0.00%	100.00%	
Final test	100.00%	0.00%	
Total:	**100.00%**	**100.00%**	

9. Assignments, course calendar and important dates

Not related to the syllabus/contents

Hours	**hours**

Unit 1 (de 20): Introduction to toxicology: Definition and types of toxic. Dose-response relationship: types of toxicity. Routes of exposure. Absorption. Metabolism. Excretion. Toxicokinetics Bioaccumulation and biomagnification.

Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	1

Unit 2 (de 20): Biomarkers Definition of biomarker. Biomarkers of effect and exposure. Types of biomarkers of effect: specific and general.

Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	2

Unit 3 (de 20): Analytical techniques in toxicology: extraction and purification of organic and inorganic compounds, chromatography, UV-Vis spectrophotometry, absorption and atomic emission, mass spectrometry.

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	1
Unit 4 (de 20): Agricultural management and biodiversity conservation. Indirect effects of pesticides. Population trends of wild birds.	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	1
Unit 5 (de 20): Direct effects of agrochemicals. Pesticides: anticholinesterase insecticides, anticoagulant rodenticides, fungicides and herbicides. Fertilizers: Nitrates.	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Unit 6 (de 20): Problem of the use of poison. Origin, types of poison, diagnosis, actions.	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	1
Unit 7 (de 20): Persistent organic pollutants Organochlorine pesticides. PCBs. Dioxins and furans. Endocrine disruption	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Unit 8 (de 20): Emerging contaminants: diphenyl polybrominated, polyfluorinated, nanomaterial ethers.	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	1
Unit 9 (de 20): Oil pollution in the marine environment. Polycyclic aromatic hydrocarbons. Adverse effects in seabirds.	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Unit 10 (de 20): Plumbing in wild birds. Exhibition in waterfowl, land and raptors. Adverse effects of lead. Alternatives to lead ammunition.	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Unit 11 (de 20): Contamination by other heavy metals and metalloids: mercury, cadmium, arsenic, selenium.	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Unit 12 (de 20): Veterinary drugs: adverse effects on scavenger species. Diclofenac in Asian vultures, other anti-inflammatories and antibiotics.	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Unit 13 (de 20): Toxins Toxiinfections food. Botulism. Cyanobacterial toxins: microcystins and other types. Mycotoxins	
Activities	**Hours**
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	4
Unit 14 (de 20): Biomarkers Determination of cerebral acetylcholinesterase activity in animals exposed to organophosphates and carbamates. In vitro reactivation techniques of enzymatic activity.	
Activities	**Hours**
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	4
Unit 15 (de 20): Analytical Toxicology Analysis of pesticides and poisons: solvent extraction, purification by gel permeation chromatography and analysis by gas chromatography coupled to mass spectrometry.	
Activities	**Hours**
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	4
Unit 16 (de 20): Analytical toxicology: Determination of anticoagulant rodenticides	
Activities	**Hours**
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	4
Unit 17 (de 20): Analytical Toxicology Heavy metal analysis: microwave oven digestion and atomic absorption analysis in graphite chamber.	
Activities	**Hours**
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	4
Unit 18 (de 20): Field study	
Activities	**Hours**
In-class Debates and forums [PRESENCIAL][project-based learning]	1.5
Writing of reports or projects [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	30
Group tutoring sessions [PRESENCIAL][Group tutoring sessions]	5
Writing of reports or projects [AUTÓNOMA][Project/Problem Based Learning (PBL)]	30
Problem solving and/or case studies [PRESENCIAL][Group Work]	12.5
Unit 19 (de 20): Experimental design.	
Activities	**Hours**
Study and Exam Preparation [AUTÓNOMA][Self-study]	30
Final test [PRESENCIAL][Problem solving and exercises]	1
Global activity	
Activities	**hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	19
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	20
In-class Debates and forums [PRESENCIAL][project-based learning]	1.5
Writing of reports or projects [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	30
Group tutoring sessions [PRESENCIAL][Group tutoring sessions]	5
Writing of reports or projects [AUTÓNOMA][Project/Problem Based Learning (PBL)]	30
Problem solving and/or case studies [PRESENCIAL][Group Work]	12.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	30
Final test [PRESENCIAL][Problem solving and exercises]	1
Total horas:	149

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Beyer, W.N., Meador, J.P.	Environmental Contaminants in Biota: Interpreting Tissue Concentrations	CRC Pre	Boca Raton, FL		2011	
Elliott, J.E., Bishop, C.A., Morrisey, C.A.	Wildlife Ecotoxicology: Forensic Approaches	Springer			2011	
Hoffman, D.J., Rattner, B.A., Burton G.A., Cairns, J.	Handbook of Ecotoxicology	Lewis Publishers	Boca Raton, FL		2003	
Shore, R.F., Rattner, B.A.	Ecotoxicology of Wild Mammals	John Wiley and Sons Ltd	Chichester, UK		2001	