

	PROCESO PARA EL DESARROLLO DE LAS ENSEÑANZAS DE LA FACULTAD DE CIENCIAS DE LA UEx		
	Curso académico: 2025-26	Código: P/CL009_FC_D002	

COURSE PROGRAM

Identification and characteristics of the course			
Code	500214	ECTS Credits	6
Course name (English)	ETHOLOGY		
Course name (Spanish)	ETOLOGÍA		
Degree programs	BIOLOGY		
Faculty/School	FACULTY OF SCIENCES		
Semester	7	Type of course	COMPULSORY
Module	ANIMAL BIOLOGY		
Matter	ZOOLOGY		
Lecturer/s			
Name	Office	E-mail	Web page
Alfonso Marzal Reynolds	Biology building, 3rd floor	amarzal@unex.es	
Subject Area	Zoology		
Department	Anatomy, Cellular Biology and Zoology		
Coordinating Lecturer (If more than one)			
Competencies			
Basic Competencies			
CB1: Students should be able to show that they know and understand facts and contents in a field of study which, based on a previous general secondary school level, have been extended to those included in advanced textbooks and, in some aspects, come from the front line of their field of study.			
CB2: Students should be able to apply their knowledge professionally in their future jobs or tasks and should have the competencies to develop and defend arguments and solve problems in their field of study.			
CB3: Students should be able to collect and interpret relevant data (typically within their field of study) to give an educated opinion about relevant social, scientific or ethical issues.			
CB4: Students should be able to communicate information, ideas, problems and solutions to both specialized and non-specialized audiences.			
CB5: Students should develop the learning skills required to undertake further studies with a high degree of independence.			
General Competencies			

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CG1: To train biologists with general and specific competencies, capable of undertaking tasks in all fields of biology, developing their activities in public or private companies and institutions or creating their own companies.
CG2: To provide the students with the skills to successfully pursue the postgraduate courses that will enable them specifically to work in the fields of education, research or other professions.
CG3: To provide the graduate students with the ability to independently generate, acquire and process information related with Biology.
CG4: To enable them to plan, carry out and critically analyse processes of knowledge in the realm of their activity.
CG5: The final aim is to train graduate students capable to undertake the tasks officially stipulated for professional biologists, as defined in the directive of April 5, 2006 of the Presidential office of the Regional Government of Extremadura (DOE April 20, 2006).
Transversal Competencies
CT1: To apply the acquired knowledge on the Grade on their job performance in a right and professional way, and to develop with confidence in the lab.
CT2: To use and apply Information and Communications technologies (ICTs) on training and professional field.
CT3: To know and understand the information in advanced textbooks and to have access to the knowledge coming from the front line of their field of study.
CT4: To develop the learning, organization and planning skills, necessary both to continue with further studies with a high degree of independence and to perform professionally.
CT5: To interpret, analyse and synthesise relevant data and information that will enable the student to develop ideas, solve problems and give critical arguments about important social, scientific or ethical issues.
CT6: To transmit effectively results and conclusions to specialized and non-specialized audiences.
CT7: To express oneself correctly orally and in writing in the native language, as well as master a foreign language, preferably in English.
CT8: To lead or work on a team positively adapting to different contexts or situations.
CT9: To respect the fundamental rights and equality of men and women, and to acquire an ethic compromise of respect to life and natural environment.
Specific Competencies
CE3: To know and understand the structure, morphology, organization and development of living beings.
CE4: To know the functions of living beings, its regulation and integration, and to analyse and interpretative their functional adaptations to the environment.
CE5: To distinguish different organization levels of living beings, from molecular to community of organisms, as well as the interaction between them and the environment.
CE7: To understand the origin and evolution of life, identifying the evolutionary processes and mechanisms, including systematics, phylogeny and biogeography of the modern and extinct living beings.

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CE8: To be able to perform, analyse and evaluate studies on biodiversity, as well as to conserve, manage and restore biodiversity.

CE12: To sample, characterize, preserve and manage populations and ecosystems, and to analyse the behaviour of living beings, being able to evaluate the environmental impact.

CE14: To provide Biology education according to law regulations.

Contents

Course outline

To teach students the basis of the study of animal behaviour. To show the value of the conduct of animals, both at individual and species level. To show how behaviour can maximize fitness of individuals. To understand that behaviour is adaptive, and that genetic and ecology can interact to determine the behaviour. To explain the importance of the study of animal behaviour related to evolution and its importance on biological studies.

Methodological objectives:

1. To use adequately specific scientific terminology in Ethology
2. To identify the possible factors determining Animal Behaviour
3. To promote the observation and analysis of behaviour
4. Identify and determine the criteria required for the design of practical experiences for the study of Ethology.

Course syllabus

Unit 1. Introduction to Ethology.

Definitions. History of Ethology and aims of study. New lines of study. Behavioural ecology and evolution. Methodologies for the study of animal behaviour.

Unit 2. Basic concepts and scientific terms.

Four levels to explain animal behaviour: proximate cause, onthogeny, phylogeny and adaptive value. Proximate and ultimate causes. Natural selection, individual selection and group selection. Fitness. Life histories. Trade-offs. Adaptation. Stable Evolutionary strategies. Genetic basis of animal behaviour.

Unit 3. Resource competition.

Introduction. Exploitation competition: ideal free distribution. Competition for resource defence. Combination of ideal free distribution and competition for resource defence. Economy of resource defence. Territoriality. Costs and benefits of resource defence. Dispersion and migration: costs and benefits.

Unit 4. Species interaction and co-evolution.

Introduction. Classification of species interactions. Coevolution and arm race: Red Queen Hypothesis. Mutualism and neutral relationships. Antagonistic relationships: predation, parasitism, herbivorism. Crypsis. Warning signals: mimetic.

Unit 5. Game theory: fights and their evaluation.

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Introduction. Game theory. Doves and hawks. Cost and benefit balance. Resource value. Ability. Dominance.

Unit 6. Sex and mating systems.

Cost of sex. Anisogamy and the origin of sex. Benefits of sexual reproduction. Factors influencing mating systems: ecology and sex ratio. Monogamy. Polygamy: resource defence, female defence. Leks. Polyandry. Polygynandry and Polyandrogeny. Dispersion.

Unit 7. Sexual selection.

Introduction. Secondary sexual characters. Honest signals. Within and between sexes competitions. Mate choice: resources and good genes. Fisher hypothesis. Handicap hypothesis and other alternatives. Sexual selection in humans.

Unit 8. Parental investment.

Concepts. Factors influencing paternal care. Costs and benefits of parental care. Reproductive costs and optimal breeding. Paternal – sons conflict. Sibling conflicts. Sex ration and manipulation of sex ratio.

Unit 9. Life in groups.

Introduction. Costs and benefits of life in groups. Social interactions. Social hierarchies. Stable and temporal groups.

Unit 10. Cooperation and help: altruism and cooperative behaviours (I).

Darwin's problems: altruism and cooperation. Individual selection or group selection? Hamilton's theory, kin selection and inclusive fitness. Kin recognition. Altruism based on kin selection. Cooperative breeding

Unit 11. Cooperation and help: altruism and cooperative behaviours (II).

Social insects. Eusociability. Cooperation between vertebrates and insects.

Unit 12. Behavioural responses in a changing world.

Global change: definition and characteristics. Specific behavioural responses in a global change scenario: adaptation, exclusion, and migration. Behavioural responses to urbanization, climate change, global warming and habitat alteration.

PRACTICAL ACTIVITIES (involving all units)

1. FIELD WORK PRACTICE: Effects of malaria infection on anti-predator behaviour of birds. Students will capture, banding and taking body measurements and blood samples of wild birds with the aim to explore the host – parasite interactions and the anti-predator behaviour of their hosts.

2. AUDIOVISUAL TRAINING. Each group of students will visualize, analyse and discuss the results from five scientific videos from the serial "Discovering the Animal Behaviour" (CO-170/2010), edited by the Spanish Society of Ethology.

3. PRESENTATION OF RESULTS FROM INVESTIGATIONS ON ANIMAL BEHAVIOUR.

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Students will present the results from investigation on Animal Behaviour. These investigations will be selected from recent papers published in Evolutionary ecology and behaviour journals. Students should present the scientific results via video-tutorial or audio podcast.

Educational activities								
Student workload in hours by lesson		Lectures	Practical activities				Monitoring activity	Homework
Lesson	Total	L	HI	LAB	COM	SEM	SGT	PS
1	3	1						2
2	7,5	2						5,5
3	17	5						10
4	14,5	5		2				8,5
5	13,5	4		2				7,5
6	17,5	4		3				10,5
7	19	5		2				10
8	16	4		2				10
9	11,5	4		2				6,5
10	10,5	3		2				6,5
11	10,5	3						7,5
12	7,5	3						5,5
Assessment	2	2						
TOTAL	150	45		15				90

L: Lectures (85 students)
 HI: Hospital internships (7 students)
 LAB: Laboratory or field practices (15 students)
 COM: Computer room or language laboratory practices (20 students)
 SEM: Problem classes or seminars or case studies (40 students)
 SGT: Scheduled group tutorials (educational monitoring, ECTS type tutorials)
 PS: Personal study, individual or group work and reading of bibliography

Teaching Methodologies
1. Explanation and discussion of contents. 2. Practical classes, such as labs, computer classes and field work. 3. Student personal work.

Learning outcomes
Students will be able to understand: <ul style="list-style-type: none"> • The basis of the study of animal behaviour. • The value of the conduct of animals, both at individual and species level. • How behaviour can maximize fitness of individuals.

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- That behaviour is adaptive, and that genetic and ecology can interact to determine the behaviour.
- The importance of the study of animal behaviour related to evolution and its importance on biological studies

Assessment systems

The following grading criteria are applicable to all evaluation calls of the course during the academic year 2021-2022. There are two assessment systems:

1. Continuous assessment modality: assessment system made up of various activities distributed throughout the teaching semester of a subject. This modality can include a final test on the official examination date for each call (theoretical exam), seminars, videos and practice fieldworks.

- The highest score of the course will be 10 points. 7 points will be from final theoretical exam and 3 points will correspond to practical program. 5 points will be needed to pass the course.

- The overall score will be the sum of theoretical exam and practical program.

- A minimum of 3 points (out of a total score of 7 points) on the final exam and 1.5 points (out of a total score of 3 points) on practical program will be needed to sum both scores.

- At the end of the semester there will be a final exam where all the theoretical contents of the course will be evaluated. The highest score will be 7 points. The final exam will include eight short essay questions and one practical exercise. The answers will be evaluated by their contents, but also by the quality of the writing and the ability to synthesize information.

- Two online questionnaires of 20 questions each should be filled by students to assess the acquired knowledge during fieldwork and lab practice. These questionnaires will be done no later than one week after the practice is done. The highest score will be 1 point for each questionnaire.

- Presentation of Investigations on Animal Behaviour will be evaluated as a maximum of 1 point. These works could be presented in two different formats: video-tutorial or audio podcast.

2. Global evaluation modality: evaluation system consisting exclusively of a final test, which includes all the contents (theoretical: 7 points; practical: 3 points) of the subject and which will be carried out on the official date of each call.

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Bibliography (basic and complementary)

- Rubenstein, D. & Alcock, J. 2018. Animal Behavior. 11th International Edition. Sinauer Associates. Sunderland, MA. USA. §
- Candolin, U. & Wong B.B.M. 2012. Behavioural Responses to a Changing World: Mechanisms and Consequences. Oxford University Press, UK.
- Carranza, J. 2016. Etología Adaptativa: el comportamiento como producto de la selección natural. UCOPress y Publ. Universidad de Extremadura. 704 pp. ISBN 978-84-7723-988-8. §
- Davies, N.B., Krebs, J.R. and West, S.A. 2012. An Introduction to Behavioral Ecology Fourth Edition. Wiley-Blackwell, U.K. §
- Soler, M. 2012. Adaptive Behaviour: Understanding the Human Animal. Editorial Síntesis.*

* Free Access to digital edition

§ Available at UEx library

Other resources and complementary educational materials

- Discovering Animal Behaviour (Spanish Ethology Society).
(http://www.albertoredondo.tv/series.php?idioma=es&id_serie=3)
- The life of Mammals. BBC. <http://www.bbc.co.uk/programmes/b00bfyvp>
- The life of Birds. BBC. <http://www.bbc.co.uk/programmes/b007qn69>

Web resources:

- The International Society for Behavioural Ecology: <http://www.behavecol.com>
- Sociedad Española de Etología y Ecología Evolutiva: <http://ecoevo.uvigo.es/web-see/index.html>
- Sociedad Española de Biología Evolutiva: <http://sesbe.org>

Audio Podcasts:

- A hombros de gigantes. RNE. <http://www.rtve.es/alacarta/audios/a-hombros-de-gigantes/>
- Ciencia al cubo. RNE. <http://www.rtve.es/alacarta/audios/ciencia-al-cubo/>

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- The Behavioural Ecology and Evolution Podcast. <http://thebeepcast.blogspot.com.es>
- Evolution, Ecology and Behavior – Audio. Yale University.
<https://podcasts.apple.com/us/podcast/evolution-ecology-and-behavior-audio/id341652737>
- University of Oxford Podcast. Evolution. <https://podcasts.ox.ac.uk/keywords/evolution>
- The Natural Selection Podcast. The University of Exeter's Centre for Ecology and Conservation. <https://naturalselectionpodcast.weebly.com/>