COURSE DATA

DATA SUBJECT

Code: 33061
Name: Ethology
Cycle: Undergraduate Studies
ECTS Credits: 5
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1100 - Degree in Biology	Facultat de Ciències Biològiques	4	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1100 - Degree in Biology	Complements of biodiversity and conservation	ELECTIVES

COORDINATION

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SUMMARY

The Ethology course, with 5 ECTS credits, is part of the module entitled Supplements of Biodiversity and Conservation which is offered for students in their 4th year of the four-year degree in Biology.

Ethology is a scientific discipline devoted to the study of animal and human behavior from an evolutionary and naturalistic perspective. Ethology is a biological discipline, traditionally considered a part of Zoology, and its conceptual foundations are firmly grounded in the theoretical framework provided by evolutionary biology. Ethologists are interested in the movements, postures, sounds, smells and colors that animals use to interact with others of the same or of a different species, to find their way through the environment, to reproduce, to care for their offspring, to eat and avoid being eaten, etc. In brief, ethologists study what animals do and how and why they do it. Behavior is one of the most important elements of an animal's phenotype. For example, behavior is crucial for many biological adaptations and its study has made important contributions to evolutionary biology.

Ethology has undergone important changes since its founding during the first decades of the XX century. The key actors in the establishment of ethology as a discipline were the Nobel award recipients Konrad Lorenz and Niko Tinbergen. Despite being relatively young, Ethology is a highly dynamic discipline that holds an enormous potential for further development. Ethologists use a multidisciplinary, integrative and comparative approach in their research, and are interested in the study of the mechanisms, development, function and evolution of behavior. The comparative approach fosters an attitude of respect and appreciation for biodiversity and enables ethologists to study human behavior from a perspective different from that used by other, more human-centered disciplines. Given its multidisciplinary nature, Ethology maintains links with several other disciplines that students will encounter during their career.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

COMPETENCES / LEARNING OUTCOMES

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Apreciación del rigor, el trabajo metódico, y la solidez de los resultados.

Capacidad de análisis, síntesis y razonamiento crítico.

Capacidad de análisis crítico de textos científicos.

Capacidad de organización, planificación y gestión de la información.

Capacidad de resolución de problemas y toma de decisiones.

Capacidad de utilización de herramientas matemáticas y estadísticas.

Conocer e interpretar el comportamiento animal.

Conocer las interacciones entre especies.

Conocimiento y aplicación del método científico.

Reflexión ética sobre la actividad profesional.

Saber analizar datos usando herramientas estadísticas apropiadas.

Uso del inglés como vehículo de comunicación científica.

Utilización del lenguaje científico oral y escrito.

DESCRIPTION OF CONTENTS

1. BASIC ISSUES

Topic 1. Introduction to Ethology: Definition and importance of Ethology. Brief history of animal behavior studies. The empirical problem: What is the subject matter of Ethology? The ethological approach. The theoretical problem: Tinbergen's four whys of Ethology. Elements of the ethological attitude. An example of ethological research. Anthropomorphism and the study of animal behavior.

2. MECHANISMS OF BEHAVIOR

Topic 2. Sensory mechanisms and perception: The sensory capacities of animals: Implications for the study of behavior. Sensation and perception. Pattern recognition: sign stimuli and releasers. Selectivity: central and peripheral filtering. Supernormal stimuli. More complex situations.

Topic 3. Mechanisms of orientation and navigation: Orientation and navigation on a small scale: taxes and kineses. Long-distance orientation and homing phenomena. Piloting. Directional orientation. Transverse orientation. Path integration. True navigation: the map and compass model of animal navigation.

Topic 4. Motivation and cognition: Different types of causal explanation. Two ways to understand motivation. How is motivation measured? Appetitive behavior and consummatory act. Fixed action patterns (FAPs) and the spontaneity of behavior. Motivational models. Motivational systems. Goal-directed behavior: representation and intentionality. Animal cognition. Consciousness and animal welfare.

3. BEHAVIORAL GENETICS AND THE DEVELOPMENT OF BEHAVIOR

Topic 5. The genetics of behavior: Genes and behavior. Exceptionalism and the genetics of human behavior. Myths and metaphors in the study of behavioral genetics. Behavioral differences due to alterations in a single gene: Studies with mutants. Studies with hybrids. Polygenic inheritance. Artificial selection experiments. Twin studies. The interactive theory of development. Heritability. From genes to behavior: Mechanisms. The myth of genetic determinism.

Topic 6. The nature-nurture debate: Two models of behavioral development. Innate behavior and learned behavior. Difficulties with the innate concept. Deprivation experiments. Innate behavior can be modified by experience. The modern synthesis: Nature and nurture today.

Topic 7. The development of behavior: Growth, differentiation, maturation, and experience. Definition and types of learning. Classical and instrumental conditioning. Biological constraints and predispositions in associative learning. Learning as a biological phenomenon: Costs and benefits of learning. Effects of early experience on behavioral development: Sensitive periods, imprinting, and socialization.

4. THE EVOLUTION OF BEHAVIOR

Topic 8. The phylogeny of behavior. The fossil record: Palaeoethology. The comparative method: types of comparisons. Phylogenies constructed using behavioral traits. Ethological series (ethoclines). Character mapping. Reconstruction of ancestral behaviors.

5. BEHAVIORAL ECOLOGY

Topic 9. The study of the adaptive significance of behavior: The sociobiology debate. Sociobiology and behavioral ecology. The function of behavior. Adaptation and natural selection. A critique of the adaptationist program. Direct and indirect methods for the study of the adaptive significance of behavior.

Topic 10. Cooperation and altruism: The problem of altruism. Manipulation. Direct benefits: By-product mutualism, reciprocity, indirect reciprocity (image scoring). Indirect benefits: W.D. Hamilton and kin selection. Inclusive fitness. How do animals recognize others with which they share genes? The origin of eusociality.

Topic 11. Communication: What do we mean by communication? Cues and signals. The elements of communication. The communicative context. Message and meaning of signals. The concept of information. Tactical design and strategic design. Complex signals. The duality of signals. The evolution of communicative signals. Honesty on average. Honest signaling theory: Mechanisms that guarantee the honesty of signals. Overlapping interests: Cooperative signals. Unfakeable signals: Index signals. Strategic signals: Condition-dependent signals, signals of need, conventional signals. Unreliability and deception in communication.

6. ETHOLOGY LABORATORY

Session 1. An introduction to ethological methods (I)

Session 2. An introduction to ethological methods (II)

Session 3. Population differences in minnow, Phoxinus phoxinus, behavior

Session 4. Animal sounds

Session 5. Sign stimuli and releasers: Courtship, mating, and sex pheromones in the mealworm beetle (Tenebrio molitor)

Session 6. Structure and function of fish schools

Session 7. Vigilance behavior in barnacle geese, Branta leucopsis

Session 8. The evolution of behavior

Session 9. Introduction to game theory: Computer simulations of animal combat behavior

Session 10. Human behavior: Sexual dimorphism in book-carrying behavior

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Tutorials	2,00
Theory	28,00
Laboratory	20,00
Total hours	**50,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	4,00
Independent study and work	0,00
Preparation of lessons	37,00
Preparation for assessment activities	34,00
Resolution of case studies	0,00
Total hours	**75,00**

TEACHING METHODOLOGY

Teaching of this course will comprise the following activities:

- Lecture sessions. Lectures will last 1 h during which the instructor will identify the main issues in the different topics covered. Lecture outlines will be available, on-line, prior to each lecture. However, these are not intended as substitutes for material presented in lectures, nor as a replacement for your attendance at lectures. Rather, they provide an organizational framework to lectures that may help guide your studies.
- Laboratory sessions. The laboratory portion of this course is designed to be a hands-on complement to material we will be covering in lectures. Laboratory sessions will last 2 h. At the beginning of each laboratory session the instructor will lay out the main points pertaining to that practical. Occasionally, students will be required to take an unannounced quizz that will test their knowledge of the material covered in the laboratory sessions.
- Group tutorials. Established in 2-h sessions. Will be devoted to the discussion of conceptual difficulties in ethology and to the resolution of doubts raised by the students.
- Seminars (optional). Based on availability, there will be one or two seminars taught by specialists.

Class attendance in this course is mandatory. Please arrive on time and prepared.

EVALUATION

Lecture grades will be based on a comprehensive final written exam. The exam will consist of a mixture of short answer, matching and multiple choice questions (6-10 questions in total). Student presentations will also contribute to the final lecture grade. Laboratory grades will be based on a written exam that will consist of a mixture of short answer, matching and multiple choice questions (4-6 questions in total). The score obtained in the written laboratory exam will be supplemented with a score based on the student's performance during the laboratory sessions, and will take into account attendance, attitude and participation in the proposed activities, as well as the student's capacity for team work and dexterity in the use of observational and experimental techniques. Students must attend all laboratory sessions in the groups and schedules in which they are enrolled. Relocation of students to a different laboratory group, for whatever good reasons, is not the responsibility of the instructors and should be negotiated with the secretariat of the Faculty. No attendance will be recorded when, exceptionally and at the discretion of the instructor, a student is allowed to attend a laboratory session in a group other than that in which the student is enrolled. In order to pass this course you will need to independently pass the lecture and laboratory parts of the course. Your overall final grade will be calculated as: lecture grade (70%) and laboratory grade (30%).

To further encourage class attendance and on time arrivals, we will also have a few pop quizzes throughout the course. Quizzes will not be announced and will test the students' knowledge of material covered in the current or in previous lectures. Missed quizzes cannot be made-up. Quizz scores will be part of the final grade.

lecture:

- lecture exam 60
- lecture quizzes 10

laboratory:

- lab exam 15
- supplementary note 5
- lab quizzes 10

To request the advancement of the subject call, students must have completed the compulsory activities indicated in the course guide.

REFERENCES

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- BOLHUIS, J.J. & L.-A. GIRALDEAU (Eds.). 2005. The Behavior of Animals: Mechanisms, Function and Evolution. Blackwell, Oxford, 515 p.

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- DUGATKIN, L.A. 2008. Principles of Animal Behavior (2ª ed.). Norton, New York. 675 p.

- GOODENOUGH, J., B. MCGUIRE & R. WALLACE. 2001. Perspectives on Animal Behavior (2ª ed.). John Wiley and Sons, New York, 560 p.

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- LEHNER, P.N. 1996. Handbook of Ethological Methods (2ª ed.). Cambridge University Press, Cambridge.

- MANNING, A. & M.S. DAWKINS. 2012. An Introduction to Animal Behaviour (6ª ed.). Cambridge University Press, Cambridge, 365 p

- MARTIN, P. & P.P.G. BATESON. 1991. La Medición del Comportamiento (traducción de la 1ª ed. en inglés). Alianza, Madrid, 237 p.

- MARTIN, P. & P.P.G. BATESON. 2007. Measuring Behaviour: An Introductory Guide (3ª ed.). Cambridge University Press, Cambridge, 232 p.

- McFARLAND, D. 1999. Animal Behaviour: Psychobiology, Ethology and Evolution (3ª ed.). Longman, Harlow, England, 580 p.

- NORDELL, S. & T. VALONE. 2021. Animal Behavior: Concepts, Methods, and Applications (3ª ed.). Oxford University Press, Oxford, 523 pp.

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- SLATER, P.J.B. 1999. Essentials of Animal Behaviour. Cambridge University Press, Cambridge, 243 p.

- SLATER, P.J.B. 2000. El Comportamiento Animal. Cambridge University Press, Madrid, 238 p.