



# UNIVERSITÀ DEGLI STUDI DI PALERMO

<b>DEPARTMENT</b>	Scienze e Tecnologie Biologiche, Chimiche e Farmaceutiche		
<b>ACADEMIC YEAR</b>	2016/2017		
<b>MASTER'S DEGREE (MSC)</b>	BIODIVERSITY AND ENVIRONMENTAL BIOLOGY		
<b>INTEGRATED COURSE</b>	ETHOLOGY AND ZOOLOGICAL RESEARCH LABORATORY - INTEGRATED COURSE		
<b>CODE</b>	18610		
<b>MODULES</b>	Yes		
<b>NUMBER OF MODULES</b>	3		
<b>SCIENTIFIC SECTOR(S)</b>	BIO/05		
<b>HEAD PROFESSOR(S)</b>	CAMMARATA MATTEO	Professore Ordinario	Univ. di PALERMO
<b>OTHER PROFESSOR(S)</b>	CAMPOBELLO DANIELA	Professore Associato	Univ. di PALERMO
	CAMMARATA MATTEO	Professore Ordinario	Univ. di PALERMO
	LO VALVO MARIO	Professore Associato	Univ. di PALERMO
<b>CREDITS</b>	12		
<b>PROPAEDEUTICAL SUBJECTS</b>			
<b>MUTUALIZATION</b>			
<b>YEAR</b>	2		
<b>TERM (SEMESTER)</b>	2° semester		
<b>ATTENDANCE</b>	Not mandatory		
<b>EVALUATION</b>	Out of 30		
<b>TEACHER OFFICE HOURS</b>	<p><b>CAMMARATA MATTEO</b>  Monday 09:00 11:30 Viale delle Scienze ED 16 Dipartimento della terra e del mare</p> <p><b>CAMPOBELLO DANIELA</b>  Monday 09:00 17:00 Via Archirafi 18, Piano I, Stanza 18 - dal Lunedì al Venerdì, previo appuntamento concordato per email  Tuesday 15:00 17:00 Sede del Consorzio Universitario, corso Vittorio Emanuele, 92, 93100 Caltanissetta</p> <p><b>LO VALVO MARIO</b>  Monday 9:00 11:00 plesso di Biologia Animale – Via Archirafi, 18 – 90123 Palermo  Tuesday 9:00 11:00 plesso di Biologia Animale – Via Archirafi, 18 – 90123 Palermo</p>		

**DOCENTE:** Prof. MATTEO CAMMARATA

<b>PREREQUISITES</b>	Basics on Zoology, Physiology, Animal anatomy.
<b>LEARNING OUTCOMES</b>	<p><b>MODULE I (ETHOLOGY)</b> Knowledge and comprehension Main goal of this course is to provide both biological bases and critical tools of the animal behaviour including basic knowledge in the field of evolutionary biology, animal communication, behaviour and adaptation to the natural environment. Applying knowledge and comprehension Ability to critically examine the main etho-zoological topics by using the available scientific literature. Capacity to effectively and clearly describe ethological themes with appropriate terminology. Autonomous thinking Critical evaluation of ethological implications Ability to critical assessment of ethological implications in the field of biodiversity and nature conservation Communication ability Acquisition of communication skills according to the type of obtained results and the best format to deploy them either to scientific venues or general public audience. Learning ability Acquisition of proper ability to get updated in relation to the international literature acquisition including sampling methods, monitoring sessions, data analysis and representation.</p> <p><b>MODULE II (ZOOLOGICAL RESEARCH LABORATORY):</b> Main aims are to allow students: to familiarize with data sampling and representation, to carry independent sampling, to interpret data and represent them correctly. Given also their former knowledge acquired during former courses, this module would allow students to design a research according to specific scientific questions related to animal organisms. Knowledge and comprehension Acquisition of basics on the software and hardware most commonly used in zoological studies. Applying knowledge and comprehension Acquisition of basics aimed to design a correct research experimental design and data sampling with lab sessions both in computer rooms and on the field. Autonomous thinking Acquisition of abilities to assess and interpret experimental data and the best format to represent them. Communication ability Acquisition of communication skills proper to the type of obtained results and the best format to deploy them either to scientific venues or general public audience. Learning ability Acquisition of proper ability to get updated in relation to sampling methods, monitoring sessions, data analysis and representation.</p> <p><b>MODULE III (FAUNA SAMPLING TECHNIQUES)</b> Knowledge and comprehension Acquisition of the ability to recognize the main species of vertebrate fauna, also through the use of manuals for recognition and identification. Applying knowledge and comprehension Acquisition of the main techniques for the census of specimens or the evaluation of wildlife populations, useful for the preparation of ethological and ecological studies or conservation. Autonomous thinking Acquisition of the ability to collect and interpret the data and to choose the most suitable analysis methods to the purpose. Communication ability Acquisition of the ability to represent and present the results of the surveys, also by using presentation software (PowerPoint) Learning ability Acquisition of the ability to get updated in relation to sampling methods, monitoring sessions, data analysis and representation of zoological data.</p>
<b>ASSESSMENT METHODS</b>	<p><b>EXAM:</b> midterm and final tests. The student will be evaluated based on the level of knowledge of the subjects and the ability to link between them, the clarity and the use of a specialized scientific language.</p> <p><b>EVALUATION CRITERIA</b> -assessment: excellent, grade: 30 - 30 cum laude, excellent knowledge of the topics of the course, excellent use of language, excellent analytical capacity, ability to apply knowledge to problem solving; - assessment: very good, grade: 26-29, good knowledge of the topics of the course, correct use of language, good analytical capacity, ability to apply knowledge to problem solving;</p>

	- assessment: good, grade: 24-25, good knowledge of the main topics of the course, correct use of language, limited ability to autonomously apply knowledge to problem solving; - assessment: satisfactory, grade: 21-23, partial knowledge of the topics of the course, satisfactory use of language, limited ability to autonomously apply knowledge to problem solving; - assessment: sufficient, grade: 18-20, minimal knowledge of the main topics of the course and of technical language, scarce ability or inability to autonomously apply knowledge to problem solving; - assessment: fail, insufficient knowledge of the topics of the course.
<b>TEACHING METHODS</b>	Lectures, teaching laboratories both in the pc room and on the field

## MODULE FAUNAL SAMPLING TECHNIQUES

*Prof. MARIO LO VALVO*

### SUGGESTED BIBLIOGRAPHY

Fowler e Cohen, 2010. Statistica per ornitologi e naturalisti. Franco Muzzio Editore  
 Materiale didattico fornito dal docente.  
 Appunti delle lezioni.

<b>AMBIT</b>	20879-Attività formative affini o integrative
<b>INDIVIDUAL STUDY (Hrs)</b>	39
<b>COURSE ACTIVITY (Hrs)</b>	36

### EDUCATIONAL OBJECTIVES OF THE MODULE

The aim of the module is the acquisition of students' knowledge of the the main techniques for the census and fauna monitoring, by the application, on field, of the different methods, and analysis, in the classroom, of the data collected using specific softwares (also Using the Geographic Information systems) and electronic spreadsheets

## SYLLABUS

Hrs	Practice
18	technical application of census and fauna monitoring
6	Use of Geographic Information Systems in wildlife conservation
6	Radio Tracking Application
6	Analysis of the results

## MODULE ETHOLOGY

*Prof. MATTEO CAMMARATA*

### SUGGESTED BIBLIOGRAPHY

Alcock John ETOLOGIA Zanichelli  
Campan- Scapini ETOLOGIA Zanichelli  
Materiale didattico distribuito dal docente.

<b>AMBIT</b>	50506-Discipline del settore biodiversità e ambiente
<b>INDIVIDUAL STUDY (Hrs)</b>	102
<b>COURSE ACTIVITY (Hrs)</b>	48

### EDUCATIONAL OBJECTIVES OF THE MODULE

The course aims to provide basic knowledge and methodology for the study of animal behaviour in an evolutionary perspective. The Ethology studies the behaviour of animals to describe the proximate and ultimate (functional) of the behaviour. The course trains students to study these subjects through the results of studies from basic and applied research.

## SYLLABUS

Hrs	Frontal teaching
2	Ethology history
4	the animals behaviour . Proximate and ultimate causes , simple and complex behaviours. innate and acquired behaviours.
2	Environment perception and sensory receptors. Typology of stimuli responses, synchronization with predictable environmental changes and internal clocks
4	Ontogeny of behavior; Neuro-ethology
4	Behavioral genetics
4	Learning, Imprinting, Experience
2	The migratory behavior between genetics and learning
2	kinship, territoriality and aggressiveness, ritualization and communication
3	Social behavior
5	Avoiding predators and finding food
4	The survival value of the behavior
2	The colonial life
2	The Development of behavior
8	The evolution of reproductive behaviour and mating systems

## MODULE ZOOLOGICAL RESEARCH LABORATORY

*Prof.ssa DANIELA CAMPOBELLO*

### SUGGESTED BIBLIOGRAPHY

Martin P., Bateson P. (2007) *Measuring Behaviour. An Introductory Guide*. Cambridge University Press, Cambridge, UK.

<b>AMBIT</b>	20879-Attività formative affini o integrative
<b>INDIVIDUAL STUDY (Hrs)</b>	39
<b>COURSE ACTIVITY (Hrs)</b>	36

### EDUCATIONAL OBJECTIVES OF THE MODULE

Main aim of the Module is to provide students basic knowledge of the appropriate use of the most common tools used to carry zoological research. Knowledge acquisition would occur within a series of laboratory sessions both in the computer room and in the field during which students will sample real data. With some examples of the most advanced hypotheses in zoological research, students would acquire the capability to turn from theory to practice. Students would familiarize with software most commonly used for data recording and analysis (Excel, Etholog) and data representation in scientific (Powerpoint) and general public (social media) contexts.

## SYLLABUS

Hrs	Practice
3	<ul style="list-style-type: none"> <li>•Introduction to the concept of a zoological research.</li> <li>•Function of teaching laboratories both in the field and in computer rooms.</li> <li>•Representation of a scientific research and spreading of its results.</li> <li>•Introduction to main software tools applied to scientific investigations.</li> </ul> <p>Introduction to the first example of field sampling and recording: quantifying animal activities. Time budget and its role in animal fitness. Field techniques.</p>
4	<p>First example of a zoological research: quantification of the time budget</p> <ul style="list-style-type: none"> <li>•Choice of a study species within an excursion at the Botanical Garden.</li> <li>•According to the species (insects, passerines, lizards, etc.) determine number and frequency of sampling sessions.</li> </ul> <p>Recording component variables of the time budget by via direct observation and video recordings.</p>
3	<ul style="list-style-type: none"> <li>•Treatment of data, both on notes and videos, recorded during previous sampling with the use of Excel and Etholog.</li> </ul>
4	<p>Second example of a zoological research: Energetic optimization</p> <ul style="list-style-type: none"> <li>•Within an excursion at the Botanical Garden, quantification of foraging activities of passerines on flowers, under control and experimental conditions</li> </ul> <p>Recording animal activities via direct observations and with video cams.</p>
3	<p>Introduction to the third example of a zoological research: effect of competition on animal distribution. Testing criteria adopted by organisms to spread in space and time (Ideal Free Distribution). Preparation for the second field sampling.</p>
3	<p>Introduction to the third example of a zoological research: effect of competition on animal distribution. Testing criteria adopted by organisms to spread in space and time (Ideal Free Distribution). Preparation for the second field sampling</p>
4	<p>Third example of a zoological research: Ideal Free Distribution</p> <ul style="list-style-type: none"> <li>•Within an excursion at the Botanical Garden, building two different experimental conditions in two separate areas at the Botanical Garden.</li> <li>•Quantification of individual agonistic interactions among avian species.</li> </ul> <p>Recording animal activities via direct observations and with video cams.</p>
3	<ul style="list-style-type: none"> <li>•Treatment of data, both on notes and videos, recorded during previous sampling with the use of Excel and Etholog.</li> </ul> <p>Data representation: graphs</p>
4	<p>Representation of data from a zoological research</p> <ul style="list-style-type: none"> <li>•Slide preparation in Powerpoint</li> <li>•Poster preparation</li> <li>•Spreading results in scientific context: manuscript preparation</li> </ul> <p>Spreading results in non-scientific context: correct use of social media</p>
3	<ul style="list-style-type: none"> <li>•Student presentation of data collected during field sampling</li> </ul>
2	<p>Lab reviews and Question-and-Answer sessions on most difficult topics.</p>