

COURSE OF STUDY Management of green spaces, forests and protected areas

ACADEMIC YEAR 2023-2024

ACADEMIC SUBJECT *Zoology & Entomology (6 CFU)*; Module of I.C. Zoology and Entomology (9 CFU)

General information	
Year of the course	<i>1 Year</i>
Academic calendar (starting and ending date)	<i>Il semestre (04/03/24-14/06/24)</i>
Credits (CFU/ETCS):	6
SSD	<i>AGR/11 General & Applied Entomology</i>
Language	<i>Italian</i>
Mode of attendance	<i>Not mandatory</i>

Professor/ Lecturer	
Name and Surname	<i>Eustachio Tarasco</i>
E-mail	<i>eustachio.tarasco@uniba.it</i>
Telephone	<i>+390805442877/+393337633638</i>
Department and address	<i>Via Amendola 165/A Bari – DiSSPA – Entomologia - V floor librery building</i>
Virtual room	<i>teams code qc1k4br</i>
Office Hours (and modalities: e.g., by appointment, on line, etc.)	<i>Mon, Wed, Fri, 15:00 - 17:00</i>

Work schedule			
Hours			
Total	Lectures	Hands-on (laboratory, workshops, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
<i>150</i>	<i>32</i>	<i>28</i>	<i>90</i>
CFU/ETCS			
<i>6</i>	<i>4</i>	<i>2</i>	

Learning Objectives	<ol style="list-style-type: none"> 1. Know the biology, ethology and ecology of animals belonging to <i>phyla</i> and classes of greatest interest in the agroforest environment 2. Understand the relationships between the most important vertebrates and invertebrates and forest productivity. 3. Know the various means and methods for the sampling of fauna and the problems related to the presence of the "most dangerous" mammal and bird species in the territory. 4. Know the main characteristics of the morphology, physiology, systematics, and ecology of insects with particular reference to the most harmful species 5. Know the essential tools to implement strategies for biological, microbiological and integrated control in the forest and agricultural territory.
Course prerequisites	<i>Basic biological knowledge</i>

Teaching strategie	<i>Topics of the course will be covered with the help of Power Point presentations, group exercises, preparation of papers and/or classroom research related to case studies and analysis of scientific publications. All material will be shared using the electronic platform</i>
---------------------------	---

<p>Expected learning outcomes in terms of</p>	<p><i>the set of cultural, disciplinary and methodological knowledge, skills and competences defined during the design of the CdS, for the zoological and entomological field, in line with the provisions of the Dublin Descriptors</i></p>
<p>Knowledge and understanding on:</p>	<ul style="list-style-type: none"> ○ Knowledge of the basic elements of Zoology and Entomology ○ Knowledge of the interactions of animals and arthropods in particular with the agroforestry and urban environment;
<p>Applying knowledge and understanding on:</p>	<ul style="list-style-type: none"> ○ Ability to assess zoological biodiversity, with particular regard to arthropod fauna, agroforestry and urban ecosystems. ○ Ability to analyze the relationships between fauna (arthropodfauna in particular) and the various ecosystems of the agroforestry territory
<p>Soft skills</p>	<ul style="list-style-type: none"> ● <i>Making informed judgments and choices</i> <ul style="list-style-type: none"> ○ provide for the continuous updating of knowledge in the specific sector, also with tools that make use of new communication and information technologies. ○ address the typical problems of useful and harmful fauna (arthropodfauna in particular) present in the agro-forestry and urban territory, also through innovative technical solutions. ● <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> ○ present the results of projects and works developed in first person or in group activities, through the drafting of technical reports and oral presentation, using an appropriate technical language. ● <i>Capacities to continue learning.</i> <ul style="list-style-type: none"> ○ continue the study autonomously providing for the continuous updating of knowledge in the specific sector, ○ have developed the learning skills necessary to undertake subsequent studies with a high degree of autonomy.
<p>Syllabus</p>	<p>Introduction to Zoology and Entomology – Historical notes, zoology and applied entomology. Levels of organization of animals – Organization of living matter. Prokaryotic and eukaryotic cells. Structure and functions of the animal cell. Types of tissues and functional organization of the animal body. Supportive, digestive, respiratory, excretory, endocrine, nervous and sensory functions; movement and architecture of the animal body. Reproduction - Asexual and sexual in Protozoa and Metazoa. Mitosis and meiosis, gametogenesis, morphology of gametes; amphigony, hermaphroditism and parthenogenesis. Reproductive strategies. Oviparous, ovoviviparous and viviparous. Embryonic and post-embryonic development - Types of eggs. Fertilization. Metamorphosis and growth. Sex determination. Phylogeny and classification - Ethology - Behavior. Society, mutualism, symbiosis, commensalism and parasitism. Migrations. Communication systems. Ecology - Individuals, populations, communities and ecosystems. Food webs. Population dynamics. Zoogeographic regions. Ethics and animal world – The animals of the forest ecosystem - Features of animal types: Protozoa, Porifera, Cnidarians, Flatworms, Cestodes, Rotifers, Nematodes, Molluscs, Annelids, Arthropods, Bryozoans, Echinoderms, Fish, Amphibians, Reptiles, Birds and Mammals. Recognition and generality of Nematodes and Arthropods of particular agro-forestry and urban interest.</p> <p>Insects of the agroforestry and urban ecosystem, beneficial insects (pollinators, predators and parasitoids), defoliators, phylomyces, phyllophagous,</p>

	xylophagous, galligens, roots, hematophagous, disease vectors and insects of foodstuffs
	Phytosanitary Monitoring – Integrated management of insect pests
Content knowledge	
Texts and readings	<ul style="list-style-type: none"> • Lineamenti di Zoologia Forestale (Battisti et al., Padova University Press). • Zoologia (Mitchell et al., Zanichelli Ed.). • Manuale di Zoologia Agraria (Autori vari; Antonio Dalfino Ed.). • Istituzioni di Zoologia (Ranzi et al.; Ambrosiana Ed.). • Tremblay – Entomologia applicata (Liguori Ed.). • Masutti L. Zangheri S. – Entomologia generale e applicata (CEDAM Ed); • Davies R.G. - Lineamenti di entomologia (Zanichelli Ed.); • Chinery M. - Guida agli Insetti d'Europa (Muzio Ed.); • lectures notes <p><i>For foreign students (LLP-Erasmus, Tempus, ecc.) the book is: The Insects: An Outline of Entomology. P. J. Gullan & Peter Cranston</i></p>
Notes, additional materials	<p><i>Students will obtain copies of the presentations used during the lessons, including exercises when they provide application protocols in the laboratory, by accessing the reference digital platform. WARNINGS: the student is informed that a that deals with all the topics of the course together in a weighted way is not suggested. The notions on the various aspects of teaching can be found in a fragmentary or extremely specialized way in Italian and foreign journals. Therefore, the student is strongly encouraged to follow the course so that he can have up-to-date notes essential for learning.</i></p>
Repository	<p><i>The topics of the course will be covered with the help of Power Point presentations, classroom exercises related to case studies, analysis of scientific publications. All the material will be shared through the electronic platform and made available for at least three years after the teaching has been delivered.</i></p>

Assessment	
Assessment methods	<p><i>The evaluation of the student's preparation takes place on the basis of pre-established criteria, as detailed in Annex A of the Academic Regulations of the Study Programme in Management of green spaces, woods and protected areas</i></p>
Assessment criteria	<ul style="list-style-type: none"> • Knowledge and understanding <ul style="list-style-type: none"> ○ Correctly describe entomofaunal relationships with the environment and possess sufficient knowledge about basic elements of agroforest and urban zoology and entomology. • Applying knowledge and understanding <ul style="list-style-type: none"> ○ Ability to identify tools of governance of fauna (especially Nematodes and Arthropods) in agroforestry and urban areas. Ability to critically describe the relationships that different insect groups have with the various components of urban and agroforestry ecosystems. • Autonomy of judgment <ul style="list-style-type: none"> ○ Ability to describe entomofauna and environmental contexts in the light of the reports between human activities and the natural environment. Ability to identify the policy instruments best suited to eco-friendly management and sustainable control of noxious animals (mainly Nematodes and Arthropods). • Communicating knowledge and understanding Communication skills <ul style="list-style-type: none"> ○ Knowing how to present clearly and exhaustively the results of projects and develop jobs by themselves or in group activities, through the preparation of technical reports, presentations, oral exposure, using an appropriate technical language.

	<ul style="list-style-type: none">• <i>Capacities to continue learning.</i><ul style="list-style-type: none">○ Be able to retrieve bibliographic and statistical sources themselves to continuously update their skills
Final exam and grading criteria	The evaluation of the student's preparation is based on established criteria, as detailed in Annex A of the study regulations of the graduate program
Further information	