



# UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze Agrarie, Alimentari e Forestali		
ACADEMIC YEAR	2017/2018		
MASTER'S DEGREE (MSC)	FORESTRY AND AGRO-ENVIRONMENTAL SCIENCE AND TECHNOLOGY		
INTEGRATED COURSE	ENVIRONMENTAL IMPACT EVALUATION - INTEGRATED COURSE		
CODE	18477		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	BIO/02, AGR/11		
HEAD PROFESSOR(S)	SCHICCHI ROSARIO	Professore Ordinario	Univ. di PALERMO
OTHER PROFESSOR(S)	CALECA VIRGILIO	Professore Associato	Univ. di PALERMO
	SCHICCHI ROSARIO	Professore Ordinario	Univ. di PALERMO
CREDITS	9		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	2		
TERM (SEMESTER)	2° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	<p><b>CALECA VIRGILIO</b></p> <p>Tuesday 9:00 11:00 Stanza del docente. Dipartimento di Scienze Agrarie, Alimentari e Forestali. Edificio 5. Ingresso A. Primo Piano. Stanza 05. Viale delle Scienze 90128 Palermo</p> <p>Wednesday 9:00 11:00 Stanza del docente. Dipartimento di Scienze Agrarie, Alimentari e Forestali. Edificio 5. Ingresso A. Primo Piano. Stanza 05. Viale delle Scienze 90128 Palermo</p> <p>Thursday 9:00 11:00 Stanza del docente. Dipartimento di Scienze Agrarie, Alimentari e Forestali. Edificio 5. Ingresso A. Primo Piano. Stanza 05. Viale delle Scienze 90128 Palermo</p> <p><b>SCHICCHI ROSARIO</b></p> <p>Monday 15:00 18:00 Ex Dipartimento di Scienze Botaniche Via Archirafi, 38. primo piano (Stanza prof. Schicchi)</p> <p>Tuesday 15:00 17:00 Via Archirafi, 38 primo piano, ex Dipartimento di Scienze Botaniche</p>		

<b>PREREQUISITES</b>	Basic knowledge of Systematic Botany, Entomology and Zoology. Nevertheless, to help students first lectures will remind basic concepts of the Bachelor degree.
<b>LEARNING OUTCOMES</b>	<p>Knowledge and understanding. Students through this modular subject must acquire scientific, technical and normative knowledge to manage the environmental impact assessment due to territorial, urban, agricultural plans in order to maintain a satisfactory habitat and species conservation of a Natura 2000 site. For this purpose students must acquire an adequate knowledge and understanding of legislation regarding habitats of European interest and rare, endemic, endangered plant and animal species.</p> <p>Students will also acquire knowledge on faunistic indicators, main forest pests and useful arthropods. They will be driven to understand the complexity of environmental impact assessment by faunistic indicators and the control of phytophagous forest insects.</p> <ul style="list-style-type: none"> <li>•Applying knowledge and understanding. Students must be able to: <ul style="list-style-type: none"> <li>- recognize the basic features of flora, fauna and habitats of a Natura 2000 site to avoid the approval plans contrasting the conservation of habitats and species of European interest;</li> <li>- consult and understand scientific papers on environmental impact assessment, botany, zoology, entomology and pest control, identifying useful contents for the professional activity;</li> <li>- plan fauna monitoring and insect control in forest environment adopting sustainable methods.</li> </ul> </li> <li>•Making judgements. Students will be able to: <ul style="list-style-type: none"> <li>- analyse different ecological and anthropic features ruling Natura 2000 sites;</li> <li>- perform a specific survey to draw up a report on environmental impact assessment;</li> <li>- evaluate and choose the reliable methodology of monitoring for the assigned ecological context;</li> <li>- forecast and evaluate potential results;</li> <li>- analyse obtained results in own studies and results of scientific studies on forest insects pests to choose the more adequate operative tool following suggestions of Natura 2000 network.</li> </ul> </li> <li>•Communication skills. Skill in presenting reports and studies on flora, fauna of habitats of Natura 2000 network. Skill in disseminating innovation, in expressing and talking about the importance of applying suggestions of environmental impact assessment and about concepts and technical contents on flora, fauna, habitats, control of insects potentially harmful to forest plant both to an informed audience and wide dissemination.</li> <li>•Learning skills. Skill in learning by scientific papers linked to arguments included in the lectures (Faunistic indicators, Forest Entomology, Systematic Entomology, Pest Integrated Management, Biological Control). Skill in utilising knowledge acquired along the course for subsequent masters, doctorates, specialistic seminars concerning Forest, Nature, Environment Sciences, etc.</li> </ul>
<b>ASSESSMENT METHODS</b>	<p>Intermediate written essay test at midcourse involving both modules (multiple choice and open-ended questions) and final oral exam. It will be evaluated: the completeness of contents, the ability to make connections between topics and clarity in presentation. For the written test the teacher determines the score assigned to each question a priori. During the final oral exam students can present an educational herbarium.</p> <p>Positive evaluation ranges from 18 to 30 and praise.</p> <p>The final evaluation, properly graduated, will be formulated on the basis of the following conditions:</p> <ul style="list-style-type: none"> <li>a) basic knowledge of environmental impact assessment and limited capacity to apply the learned knowledge in new situations, sufficient capacity of analysis of the studied phenomena and exposure of the followed procedures (rating 18-21);</li> <li>b) good knowledge of environmental impact assessment and ability to implement its content in situations similar to those studied, discrete capacity of analysis of the presented phenomena and exposure of the followed procedures (rating 22-25);</li> <li>c) in-depth knowledge of environmental impact assessment studied and ability to apply it to the proposed biological phenomena, but not always promptly and following a linear approach, ability of identification of higher plants and animals of the studied main families by the use of dichotomous keys, good capacity of analysis of presented phenomena and exposition of the followed procedures (rating 26-28);</li> <li>d) deep and widespread knowledge of environmental impact assessment and ability to apply its concepts promptly and correctly, ability of identification of</li> </ul>

	higher plants and animals with the use of dichotomous keys, excellent capacity in plant biological phenomena analysis and excellent capacity of communication (rating 29-30 and praise).
<b>TEACHING METHODS</b>	Lectures, laboratory and field exercises.

<b>MODULE</b> <b>PLANT BIODIVERSITY</b> <i>Prof. ROSARIO SCHICCHI</i>	
<b>SUGGESTED BIBLIOGRAPHY</b>	
<p>Appunti delle lezioni del corso. I Power Point mostrati a lezione saranno messi a disposizione sul portale della didattica. Non e' disponibile sul mercato un testo unitario calibrato sul corso. Per questo motivo gli studenti sono caldamente invitati a seguire le lezioni, integrando eventualmente gli appunti e il materiale didattico reso disponibile con i seguenti testi:</p> <p>-Genovesi P., Angelini P., Bianchi E., Dupre' E., Ercole S., Giacanelli V., Ronchi F., Stoch F. (2014). Specie e habitat di interesse comunitario in Italia: distribuzione, stato di conservazione e trend. ISPRA, Serie Rapporti, 194/2014.</p> <p>-Guida metodologica alle disposizioni dell'articolo 6, paragrafi 3 e 4 della direttiva Habitat 92/43/CEE.</p>	
<b>AMBIT</b>	21013-Attività formative affini o integrative
<b>INDIVIDUAL STUDY (Hrs)</b>	45
<b>COURSE ACTIVITY (Hrs)</b>	30
<b>EDUCATIONAL OBJECTIVES OF THE MODULE</b>	
<p>The course aims the educational objective of providing students with the basic knowledge useful to operate successfully in the territorial planning.</p> <p>To achieve this goal, the student will acquire the necessary knowledge on the relevant legislation, the habitats of Community interest and on endemic taxa, rare or endangered species of flora in order to recognize the natural and environmental significance of the proposed Sites of Community Importance (SCI), of actual SCI and Special Conservation Areas (SCA).</p>	

### SYLLABUS

Hrs	Frontal teaching
2	Community strategy for biodiversity conservation. The appropriate environmental assessment (Vinca): the Habitat Directive 92/43/EEC and the establishment of the "Natura 2000" network;
1	The guiding principles of the Vinca: prevention and precaution. Relationship between the appropriate environmental assessment and the main environmental assessments: VIA e VAS.
2	The appropriate environmental assessment in the Italian legislation (Presidential Decree no . 357/97, Presidential Decree 12 March 2003, n. 120 and subsequent amendments and additions ); the Sicily Region legislation (Circular ARTA, January 23, 2004).
2	The plans and projects of rating procedure significantly affecting the Natura 2000 network: STEP 1- Check sites (screening); STEP 2- "Appropriate evaluation"; STEP 3- Analysis of alternative solutions; STEP 4- Definition of the compensation measures.
7	Floristic features of Sicily. Indigenous and exotic flora. Endemic, rare and endangered taxa. The role of the Red Lists in the context of nature conservation . IUCN categories.
7	Vegetation aspects of Sicily. The principles of phytosociology in the Habitats Directive. The main types of habitats of community interest present in Sicily.
Hrs	Practice
9	Practical exercises on the preparation of a report of an Appropriate Assessment: description and dimensional characteristics of the project; examination of the forms relating to the Natura 2000 network SCI and / or the ZPS in intervention planning; examination of biotic components in the area of intervention and in the immediate vicinity; possible interference of the project; mitigation and restoration interventions.

## MODULE FAUNAL INDICATORS AND ARTHROPODS MANAGEMENT

Prof. VIRGILIO CALECA

### SUGGESTED BIBLIOGRAPHY

AA.VV., 2008. Atlante della Biodiversita' della Sicilia: Vertebrati terrestri. Studi & Ricerche Arpa Sicilia, Palermo 6. <http://www.ornitologiasiciliana.it/pdf/AtlasVertebrati2008.pdf>  
 Viggiani G., 1997 – Lotta biologica e integrata nella difesa fitosanitaria – Liguori Ed., Napoli, 2 voll.  
 Tremblay E. – Entomologia applicata. Tutti i volumi pubblicati. – Liguori Editore. Napoli  
 Masutti L., Zangheri S., 2001- Entomologia generale ed applicata. CEDAM, Padova  
 Pollini A. – 1998 – Manuale di Entomologia applicata. – Edagricole Bologna  
 Howe H.F. e Westley L.C., 1996 - Piante e animali: rapporti ecologici ed evolutivi. Muzzio ed., Padova.  
 Materiali didattici forniti dal docente  
 Matthey W., Della Santa E. & Wannenmacher C., 1997. Guida pratica all'ecologia. Zanichelli ed., Bologna

<b>AMBIT</b>	21013-Attività formative affini o integrative
<b>INDIVIDUAL STUDY (Hrs)</b>	90
<b>COURSE ACTIVITY (Hrs)</b>	60

### EDUCATIONAL OBJECTIVES OF THE MODULE

Faunistic indicators and management of arthropod pests

•Knowledge and understanding. Students must acquire scientific, technical and normative knowledge to manage the impact evaluation of environmental modifications through faunistic studies and to manage the control of phytophagous species of forest plants, starting from the knowledge of biology of faunistic indicators, phytophagous arthropods in forest environment and useful arthropods.

•Applying knowledge and understanding. Students must be able to:

- recognize the basic features of the fauna of the ecosystem;
- monitor insects in the main kinds of forests, evaluating local ecological conditions;
- consult and understand scientific papers on zoology, entomology and pest control, identifying useful contents for the professional activity;
- plan fauna monitoring and insect control in forest environment adopting sustainable methods.

•Making judgements. Students will be able to:

- evaluate and choose the reliable methodology of faunistic monitoring for the assigned ecological context;
- analyse obtained results in own studies and results of scientific studies on forest insects pests to choose the more adequate operative tool.

•Communication skills.

Skill in presenting reports and studies on terrestrial and freshwater fauna, insects and arthropods of forest and natural environments. Skill in disseminating innovation, in expressing and talking about concepts and technical contents on the control of insects potentially harmful to forest plant both to an informed audience and wide dissemination.

•Learning skills.

Skill in learning by scientific papers linked to arguments included in the lectures (Faunistic indicators, Forest Entomology, Systematic Entomology, Pest Integrated Management, Biological Control). Skill in utilising knowledge acquired along the course for subsequent masters, doctorates, specialistic seminars concerning Forest, Nature, Environment Sciences, etc.

## SYLLABUS

Hrs	Frontal teaching
4	Mediterranean vertebrate fauna in brief. Biodiversity hot spots
1	Isolation theory and factors influencing Sicilian animal diversity
2	Rare, widespread, endemic and allochthonous species
1	Umbrella species, flag species, key-species
2	International conventions and directives, national and regional legislation on animal species and habitat conservation
2	Use of species indicators of healthy environment and diversity
4	Techniques of census and faunistic monitoring; application to terrestrial vertebrates and invertebrates. Monitoring of soil disturbance by Carabidae. Examples of census for birds: mapping, listening points, methods of capture-mark-recapture
3	Survey of ecological diversity and calculation of indexes and descriptors among four cenoses. N, S, H parameters, and features of diversity indexes
4	I.B.E. method to monitor rivers and streams biological quality. Q.B.S. method to monitor soil biological quality
2	Useful arthropods: generalities on pollinators, predators and parasitoids of phytophagous arthropods
2	Predator Coleoptera: identification and biology of Coccinellidae and Carabidae
1	Predator Neuroptera, Diptera and Hymenoptera: identification and biology of Chrysopidae, Syrphidae and Formicoidea
1	Mites predators of mites: identification and biology of Phytoseiidae
3	Parasitoid Hymenoptera and Diptera: identification and biology of Ichneumonoidea, Chalcidoidea, Platygastroidea and Tachinidae

2	Functional biodiversity: spontaneous vegetation providing shelter and food to useful arthropods
2	Examples of application of biological control of phytophagous insects in Sicily and Italy
2	Protection of entomological endemisms
3	Biology and management of phytophagous insects of oaks: Tortrix viridana (Lepidoptera Tortricidae), Thaumetopoea processionea (Lep. Thaumetopoeidae), Lymantria dispar and Euproctis chrysorrhoea (Lep. Lymantriidae), Altica quercetorum (Coleoptera Chrysomelidae)
3	Biology and management of phytophagous insects of conifers. Traumatocampa pityocampa (Lep. Thaumetopoeidae), Matsucoccus feytaudi (Rhyncota Margarodidae), Leptoglossus occidentalis (Rhyn. Coreidae), Coleoptera Scolitidae
1	Biology and management of chestnut phytophagous insects. Dryocosmus kuriphilus (Hym. Cynipidae)
<b>Hrs</b>	<b>Practice</b>
2	How to store and organize data, error, tendency and differences measurements, basic statistical tests
2	How to store and organize data, error, tendency and differences measurements, basic statistical tests
2	I.B.E and Q.B.S. calculation
<b>Hrs</b>	<b>Workshops</b>
5	Preparation and identification of main forest arthropods
<b>Hrs</b>	<b>Others</b>
4	Technical visit with practice on monitoring of phytophagous forest insects