



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze Agrarie, Alimentari e Forestali		
ACADEMIC YEAR	2023/2024		
BACHELOR'S DEGREE (BSC)	AGRICULTURAL SCIENCES AND TECHNOLOGIES		
SUBJECT	APIDOLOGY		
TYPE OF EDUCATIONAL ACTIVITY	D		
AMBIT	10517-A scelta dello studente		
CODE	18706		
SCIENTIFIC SECTOR(S)	AGR/11		
HEAD PROFESSOR(S)	RAGUSA ERNESTO	Ricercatore	Univ. di PALERMO
OTHER PROFESSOR(S)			
CREDITS	3		
INDIVIDUAL STUDY (Hrs)	45		
COURSE ACTIVITY (Hrs)	30		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	2		
TERM (SEMESTER)	2° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	RAGUSA ERNESTO Monday 08:30 15:30 N.B. Per la sede di Caltanissetta, giorno e orario di ricevimento verranno concordati con i diretti interessati		

DOCENTE: Prof. ERNESTO RAGUSA

PREREQUISITES	To understand some topics of the course of Apidology some basic notions of entomology and zoology are necessary. However, to help students to overcome possible difficulties, some introductory lessons will recall the fundamental concepts students are supposed to have learnt in their previous studies.
LEARNING OUTCOMES	Knowledge and comprehension In this course, students will have to acquire specific scientific competences and knowledge of the apoidea with a particular focus on <i>Apis mellifera</i> , as well as the techniques to manage an apiary correctly and to recognize and control the main problems and their natural enemies. To reach this goal, students will have to acquire an adequate knowledge of the biology and ethology of the main pollinators, of their role as bio-indicators and of their relationship with the environment; students will also have to understand how to manage an apiary, and how to recognize its main problems and natural enemies. Ability to apply knowledge and comprehension Students will have to be able to recognize, also through dichotomic keys, the main apoidea and to use them to strengthen pollination within an agro-echo-system. Moreover, the correct knowledge of the beekeeping material will allow students to manage an apiary in the best manner, controlling it and defending it against the main problems and/or natural enemies. Students will also have to develop their ability to consult and understand scientific texts and reports also within the context of the most advanced research, being able to grasp what is useful for their professional activities. Ability to evaluate autonomously Capability to analyze the ecological environments, also lived in by humans , to organize a plan to strengthen the pollination of cultivations, evaluating and choosing the most suitable and appropriate species. Communicative competence Ability to explain - to both a specialized, competent audience and a non- competent audience or an audience with practical experience but limited scientific basis - studies on the apoidea, their biology and ethology, as well as on their capability to pollinate according to the different cultivars, and on all the techniques that allow a correct farming of apoidea. Learning skills Ability to understand autonomously by consulting scientific publications concerning the subjects connected with the teaching.ability to follow, exploiting the knowledge acquired in the course , in both masters and specializing courses, or specialized seminars concerning natural, environmental and forest sciences.
ASSESSMENT METHODS	Final oral examination: the organic unity of the contents will be evaluated as well as the students' ability to connect topics and issues and to explain them clearly. The evaluation is expressed with grades from 18 to 30. The final evaluation will be based on the following criteria: a) Basic minimal knowledge of the main apoidea, of the fundamental notions of their biology and of their role in the environment; basic knowledge of the correct management of an apiary; ability to use the specific language of the subject (grade: 18-21); b) A fair knowledge of the main apoidea, of their biology and their role in the environment; sufficient knowledge of the correct management of an apiary and of its main problems (grade:22-25); c) A good knowledge of the main apoidea and of their biology; ability to identify them; analysis of the topics and issues through a proper and precise language; ability to manage an apiary, to recognize and control its main problems (grade: 26-28); d) Optimal knowledge and analysis of the topics and issues of the program, dealt with in a coherent, precise, and scientific manner; ability to recognize the main apoidea and analyse their role as bio-indicators; optimal knowledge of the norms for a correct management of an apiary; optimal ability to recognize and control its main problems (grade 29-30L).
EDUCATIONAL OBJECTIVES	Formative objectives The formative objective of the course is to supply students with the basic knowledge useful to recognize and use the principal matchmakers as both pollinators and bio-indicators ; moreover, the basic knowledge of beekeeping material, of the principal diseases, of misfortunes and natural enemies, will lead the student to be able to create, manage and defend a middle-sized apiary.
TEACHING METHODS	Frontal lessons, laboratory, field observations
SUGGESTED BIBLIOGRAPHY	A. Contessi - Le api, Edagricole, Bologna, 2004. E. Tremblay - Entomologia applicata, vol.1 - Ed. Liguori, Napoli (Per le parti relative a morfologia, anatomia e fisiologia) G. Grandi – Istituzioni di Entomologia Generale – Ed. Calderini

SYLLABUS

Hrs	Frontal teaching
2	Introduction to the course; relationships between superior plants and Apoidea; bio- indicators; flower's morphology
2	Systematic frame and principal Apoidea.and pollinators
2	Bioethology: <i>Cetonia</i> sp., <i>E. balteatus</i> , <i>C. marshalli</i> , <i>Xylocopa</i> sp., <i>Scolia</i> sp., <i>Megascolia</i> sp., <i>Macroglossus stellatarum</i>
2	Morphology, anatomy and physiology of bees. Mating and reproduction. Post-embryonic development. Determinism of sex and castes
2	Organization of bee societies ; the gestural symbolic language of bees; work of worker-bees; thermoregulation

SYLLABUS

Hrs	Frontal teaching
1	The origin of rational apiculture: Langstroth and the bee space; rational beehives with movable Honeycombs; the Top Bar beehive.
1	Bee farming equipment; the main products of a beehive: honey, pollen, propolis, royal jelly, beeswax.
1	Bioethology about a new enemy: <i>Vespa orientalis</i> .
Hrs	Practice
13	Field observations.
Hrs	Workshops
4	Microscope observations: morphology of <i>Apis mellifera</i> and collected material in field observations