General information	
Academic subject	Apiculture
Degree course	Agricultural Science and Technology; Land and Environmental Science and Technology; Protection and Management of the Agro-Forest Environment
Academic Year	Second
European Credit Transfer and Accumulation System (ECTS)	6
Language	*Italian*
Academic calendar (starting and ending date)	Second semester
Attendance	*No*

Professor/ Lecturer	
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Department and address	*Ex-Faculty of Agriculture, Central Library Building, 4th floor*
Virtual headquarters	*Tutoring on Microsoft Teams "Tutoraggio studenti" team, unique code keh9f2i*
Tutoring (time and day)	Every weekday by appointment

Syllabus	
Learning Objectives	The course of beekeeping mainly focuses on honey bee biology and behaviour and on the relations among honey bees and environment, with particular regard to agroecosystems. Beekeeping practices and the main honey bee diseases will be treated as well as some aspects of laws concerning beekeeping.
Course prerequisites	*It is desirable that students have basic knowledge in zoology and entomology*
Contents	• **Introduction to the course. Honey bees systematics.** • **Honey bees society:** origins of bee social life, determination of sex and division into castes. • **Honey bee morphology, anatomy and physiology.** • **Development and tasks of queen, drone and worker bees.** • **Social physiology of honey bees:** colony cohesion and social importance of the queen; pheromones and their functions; thermal regulation; bee constructions; food search; bee language; defense of the colony. • **Bee-friendly flora.** • **Relationships between beekeeping-agriculture-environment.** • **Enemies and pathogens:** enemies; adult diseases: acariosis, varroasis, nosemiasis, amoebiasis, other minor diseases, virosis; brood diseases: American foulbrood, European foulbrood, parapest, sack brood, mycosis, virosis; intoxications and poisonings. • **Honey bee breeding:** materials and beekeeping operations. • **Honey bee products:** honey, pollen, royal jelly, wax, propolis, venom. • **Elements of beekeeping legislation.**
Books and bibliography	• Notes on the lectures. • Sammataro D., Avitabile A., 2011. The beekeeper's handbook. Comstock Pub Assoc., 4° edizione: 308 pp.
Additional materials	The teacher's Power Point presentations are available on Microsoft Teams platform, "Apicoltura per CL STA, STAF e TUGEST" team, unic code hdtj3mk • For further information:

	• Chauvin R., 1968. Traité de biologie de l'abeille. Masson et Cie, Paris. • Tautz J., 2008. The Buzz about bees: biology of a superorganism. Springer: 298 pp.

Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
Hours			
150	*32*	*28*	*90*
ECTS			
6	*4*	*2*	

Teaching strategy	
	Topics relating to frontal teaching will be carried out with the help of Power Point presentations and with the projection of videos. Practical activities will be carried out in the laboratory and / or in the apiary and will allow students to acquire applied knowledge on the management of hives and hive products. *The teaching will be delivered in blended learning mode (mixed, frontal and online teaching).*
Expected learning outcomes	
Knowledge and understanding on:	o Knowledge of morphology, anatomy and physiology of honey bees. o Knowledge of honey bee ethology. o Knowledge of relationships between bees, agriculture and the environment. o Knowledge of bee-friendly flora. o Knowledge of honey bee enemies and pathogens. o Knowledge of honey bee breeding techniques. o Knowledge of honey bee products
Applying knowledge and understanding on:	o Ability to manage an apiary. o Ability to recognize the symptoms of honey bee diseases.
Soft skills	• *Making informed judgments and choices* o Ability to judge the correctness of bee management practices, honey extraction and pollination service. • *Communicating knowledge and understanding* o Ability to clearly and correctly express the concepts and knowledge acquired. • *Capacities to continue learning* o Ability to learn and deepen the main subjects of the teaching. The expected learning outcomes, in terms of knowledge and skills, are reported in Annex A of the Didactic Regulations of the Study Program (expressed through the European Descriptors of the qualification).

Assessment and feedback	
Methods of assessment	The final exam consists of an oral test on the topics developed during the theoretical and theoretical-practical lesson hours in the classroom and in the laboratory as reported in the Didactic Regulations of the STA, STAF and TUGEST courses (Annex A). 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 Degree Courses. For students enrolled in the year of the course in which the teaching is carried out, an intermediate oral test is scheduled, with a mark expressed in thirties. For students who have taken the mid-term test, the assessment of the final exam is expressed as the average between the mark obtained in the intermediate test and the final exam. The exam for foreign students can be carried out in the form of a written questionnaire with multiple closed answers.
Evaluation criteria	• *Knowledge and understanding* o The student must demonstrate to know: o morphology, anatomy and physiology of honey bees. o ethology of honey bees. o relationships between bees, agriculture and the environment. o flora of beekeeping interest. o adversity of bees o honey bees breeding techniques. o characteristics of bee products • *Applying knowledge and understanding* o The student must own the ability: o manage an apiary o recognize the symptoms of honey bee diseases. • *Autonomy of judgment* o The student must demonstrate the ability to judge the correctness of bee management, honey extraction and pollination service practices. • *Communicating knowledge and understanding* o The student must demonstrate to be able to organize discursively and in a linear way the knowledge learned • *Communication skills* o The student must have the ability to clearly and correctly express the concepts and knowledge acquired. • *Capacities to continue learning* o Learning skills will be assessed by asking questions on the main teaching topics.
Criteria for assessment and attribution of the final mark	The marks in the intermediate and final tests are expressed in thirties. The exam is passed when the grade is greater than or equal to 18.
Additional information	