COURSE DETAILS

"FOREST INSECT MANAGEMENT"

SSD AGR/11 *

In case of an integrated course, the SSD (scientific disciplinary sector) should be written above only if all modules of the course belong to the same SSD, otherwise the SSD is to be written alongside the MODULE (see below).

DEGREE PROGRAMME: FORESTRY AND ENVIRONMENTAL SCIENCE

ACADEMIC YEAR 2021-2022

GENERAL INFORMATION – TEACHER REFERENCES

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GENERAL INFORMATION ABOUT THE COURSE

INTEGRATED COURSE (IF APPLICABLE): **NO**
MODULE (IF APPLICABLE):   **NO**
CHANNEL (IF APPLICABLE):   **NO**
YEAR OF THE DEGREE PROGRAMME (I, II, III): **II**
SEMESTER (I, II): **II**
CFU: **6**

REQUIRED PRELIMINARY COURSES (IF MENTIONED IN THE COURSE STRUCTURE "ORDINAMENTO")

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PREREQUISITES (IF APPLICABLE)

NO

LEARNING GOALS

Expected learning outcomes refer to the overall learning aims of the subject in relationship with the degree structure.

The course aims at providing students with advanced notions related to forest insect management with emphasis on ecological role and economic impact of naïve species of the Mediterranean area and on the threat posed by allochthonous insect pests.

EXPECTED LEARNING OUTCOMES (DUBLIN DESCRIPTORS)

Learning outcomes are statements of what students, endowed with adequate initial background, are expected to know, understand and/or be able to demonstrate or have acquired on successful completion of their studies (knowledge and abilties).

Descriptors such as "Knowledge and understanding" and "Applying knowledge and understanding" refer to disciplinary knowledge and should be used to designate peculiar capabilities conferred by the specific degree. The content of these sections should be relevant to what is mentioned in the course structure "ordinamento".

Knowledge and understanding

This descriptor refers to disciplinary knowledge and describes how the student can elaborate on what has learnt to convert notions in more complex and partially original reflections.

The student needs to show: (I) ability to know and understand problems related to the protection of forest ecosystems exposed to possible negative impacts related to the presence of insect pests; (II) ability to know monitoring and management tools and practices addressed to the management of key species and main trophic groups of forest pests; (III) ability to understand how the global warming disrupt the relationships among insect pests and host plants and how invasions realized by allochthonous species are promoted.
The course provides students with knowledge and advanced methodological tools needed both to identify and analyze the threat posed by insect infestations and also to manage the possible problems in appropriate manner. To this end the course will organize special field training.

Applying knowledge and understanding

This descriptor refers to disciplinary competence (knowing how to do something) that students need to acquire and describes how and at what level the student is able to apply in practice knowledge to solve problems in a variety of settings.

The student needs to show: (I) ability to handle biological samples to discriminate among insect pests, entomophagous, saprophagous and invasive species; (II) ability to collect biological data useful to develop monitoring and evaluation of the forest entomofauna; (III) ability to infer decision from available information to solve problems related to possible pest management applying the best solution in case studies.
The course delivers ability to apply knowledge in practice, promoting the use of methodological tools to manage practical issues related to naïve and invasive insect pests threatening forests, wood plantations and spreading in urban environments implementing sustainable pest control.

COURSE CONTENT/SYLLABUS

Describe the study program listing arguments and, if applicable, allocate CFU of the course among different headlines.
In case of integrated course, please specify the course content within the modules that constitute the course.

Animal communities and Mediterranean forest habitats. Diversity of forest insects and main feeding guilds in forest stands. Alien species as threat to biodiversity and ecosystem management, International and national regulations and services in the field of pest quarantine. (1,5 CFU).

Insect abundance, distribution and sampling. Demographic growth strategies and population dynamics of forest insects. Classification of population outbreaks and their environmental impacts (1 CFU).
Ecological factors affecting the populations of forest insects (density dependent and independent factors). Key mortality factors. Competition, ecological displacement and population regulation by natural enemies. Entomofauna and global warming: phytosanitary and ecological impacts (1,5 CFU).
Pest populations monitoring. Principles of integrated pest managements based on the knowledge of the insect ecology. Possible IPM applications against key pest categories in forest ecosystems (2 CFU).

READINGS/BIBLIOGRAPHY

Please list here textbooks or other readings.
Textbooks
- **Battisti A., De Battisti R., Faccoli M., Masutti L. et al., 2013. Lineamenti di Zoologia Forestale. PUP, Padova, 442 pp.**
- **Leather S., 2005. Insect sampling in forest ecosystems. Blackwell Publishing, 320 pp.**
- **Course lecture notes organized by the teacher as PDF files.**

Reference books
- **Pollini A. - Manuale di Entomologia applicata. Edagricole, Bologna (2013): 1848 pp.**
- **Wainhouse D., 2004. Ecological Methods in Forest Insect Management. Oxford University Press, 248 pp.**
- **Wermelinger B., 2021. Forest Insects in Europe. Diversity, Function, Importance. CRC Press, 363 pp.**

TEACHING METHODS

Describe how teaching activities are deployed: lectures, classes, exercises, laboratory, stages, seminars, others.
If applicable also list tools for teaching delivery (recorded lectures, multimedia, software, on line material, etc.)

Teacher will use: a) lectures for 45% of total hours; b) practical exercises for approx. 25 % of total hours, c) laboratories to further elaborate on applied knowledge for 23% of total hours; d) seminars for approx. 7% of total hours.

EXAMINATION/EVALUATION CRITERIA

a) Exam type:

Exam type	
written and oral	
only written	
only oral	**X**
project discussion	
other	

In case of a written exam, questions refer to: (*)	Multiple choice answers	
	Open answers	
	Numerical exercises	

(*) multiple options are possible

The oral exam is preceded by the identification of naive and established allochtonous insect pests. The student has to identify seven biological samples consisting of insects in adult or other developmental stages preserved in tubes, card or slide mounted, and plant parts with signs of infestation. This step is passed if the student correctly identifies four of the seven submitted samples.

The oral exam involves topics as specified in the syllabus. The student will discuss five subjects, from ecological, biological, behavioral, technical and economic points of view, relative to population dynamics, natural control, global warming, quarantine regulations, monitoring and management of forest pests.

The evaluation of the oral exam will be based on the following criteria: completeness and consistency of the answer, ability to argue and make connections, the correct use of technical language and clarity of the presentation.

b) **Evaluation pattern:**

[this field needs to be filled in only when there are different weights among written and oral exams, or among modules if this refers to an integrated course]