MODULE DESCRIPTION

General

School	Geotechnical Sciences
Department	Forest and Natural Environment Sciences

Module Information

Title	Forest Genetics and Adaptation – Evolution of Populations
Course Code	OPT.4
Level of Studies	Bachelor
Teaching Period	Winter Semester
Attendance Type	Optional
Prerequisites	No

Orientation	Weekly Hours		Year	Semester	ECTS
	Lectures	Laboratory work			
Ecosystem Ecology & Landscape Rehabilitation Section	2	1	5th	9th	3

Faculty Instructor

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Type of Module

- ☐ General Foundation
- ☐ Specific Foundation / Core
- ☐ Knowledge Deepening / Consolidation

Mode of Delivery

- ☑ Face to face
- ☑ Distance learning

Digital Module availability

- ☐ E-Study Guide
- ☐ Departments Website
- ☑ E-Learning

Language

	Teaching	Examination
Greek	☑	☑
English	☐	☐

Erasmus

- [ ] The course is offered to exchange programme students

Learning Outcomes

Students' after they successfully attended the syllabus and having previously learned the basic principles of forest genetics, they will comprehend the fundamental principles that govern the genetic system in population level and more specifically the adaptive evolutionary course of forest species alongside with the capabilities for genetic improvement emphasizing on the genetically modified trees.

List of General Competences

- [ ] Apply knowledge in practice
- [x] Work autonomously
- [ ] Work in teams
- [ ] Work in an international context
- [x] Work in an interdisciplinary team
- [x] Respect natural environment
- [x] Advance free, creative and causative thinking

Module Content (Syllabus)

The aim of the syllabus is to acquaint the students with the principles of population genetics, the dynamics of population evolution and the possibilities for genetic improvement. More specifically the syllabus covers:

- Basic principles in Population Genetics
- Gene flow, sources of genetic variability and diversity in the forest ecosystems
- Mating systems and speciation (allopatric/sympatric)
- Adaptive traits in forest species
- Geographical Patterns of diversity in forest species populations
- The theory of refugia in forest populations
- Mass phenotypic selection stages in natural forests. Programs for genetic improvement of forest species populations (clonal gardens, clonal seed orchard stands, cross-mating schemes).
- Plant breeding and genetic improvement programs
- Common garden experimental trials
- Genetically modified trees
- Exercises upon subjects of management in genetically improved populations

Educational Material Types

- [x] Book
- [x] Notes
- [x] Slide presentations
- [ ] Video lectures
- [x] Multimedia

☐ Interactive exercises

☐ Other:

Use of Information and Communication Technologies

☑ Use of ICT in Course Teaching

☐ Use of ICT in Laboratory Teaching

☑ Use of ICT in Communication with Students

☑ Use of ICT in Student Assessment

Module Organization

Please fill in the workload of each course activity

Course Activity	Workload (hours)
Lectures	40
Laboratory work	2
Field Trip/Short Individual Assignments	15
Independent Study	18
Total	75

* 1 ECTS unit corresponds to 25 hours of workload

Student Assessment Methods

☑ Written Exam with Multiple Choice Questions

☐ Written Exam with Short Answer Questions

☐ Written Exam with Extended Answer Questions

☑ Written Assignment

☐ Report

☐ Oral Exams

☐ Laboratory Assignment

Suggested Bibliography (Eudoxus and additional bibliography)

1. Pareek, A., Sopory, S.K., Bohnert, H.J., Govindjee (Eds.) (2010). Abiotic Stress Adaptation in Plants. Physiological, Molecular and Genomic Foundation. Εκδότης: Springer-Verlag Publishing.
2. Sunkar, R. (Ed). (2010). Plant Stress Tolerance. Methods and Protocols. Εκδότης: Humana Press.
3. Karabourniotis, G. (2003). Plant stress physiology. Publisher: Embryo Publications. (In Greek).
4. Fanourakis, N. (2010). Plant Genetic Improvement. Publisher: ΙΩΝ Publishing. (In Greek).
5. Panetsos, K. (1985). Genetic and Improvement of Forest Species. Publisher: Giaxoudis-Giapoulis publishing. (In Greek).