COURSE OUTLINE

1. GENERAL

SCHOOL	NATURAL SCIENCES		
ACADEMIC UNIT	BIOLOGY		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	**BIO_EMB**	**SEMESTER**	**6-8**
COURSE TITLE	**ADVANCED TOPICS IN BOTANY**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures, seminars, and Multimedia displays	2	6
Laboratory work & exercises	3	
Educational fieldwork	1 daily excursion	

COURSE TYPE	Field of Science
PREREQUISITE COURSES	The students should possess basic knowledge provided through the previously taught theoretical courses 'Plant Biology', 'Ecology' and 'Evolution'
LANGUAGE OF INSTRUCTION and EXAMINATIONS	Greek. Teaching may be however performed in English in case foreign Erasmus students attend the course.
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	https://eclass.upatras.gr/courses/BIO521/

2. LEARNING OUTCOMES

Learning outcomes

By the end of this course the student will be able to:

1. Understand the basic principles and processes of speciation, as well as the reasons underlying the creation of endemism, diversity and biogeographical patterns on a global and local scale
2. Understand the fundamentals of conservation biology and the relevant risk categories of the rare, protected, threatened and endangered plant taxa
3. Understand how many endemic plant taxa exist in Greece, if there are any endemic diversity hotspots in Greece, where are these hotspots located and the reasons why they were created
4. Distinguish the rare, threatened and protected plant taxa of Greece
5. Handle the most recent and widely used protocols for the monitoring of rare, protected and endangered species
6. Estimate the extinction risk of rare, endemic and protected plant taxa
7. Use up to date tools for molecular analysis, interpret the results and apply them for the conservation of rare, endemic, protected plant taxa
8. Apply the ecological principles in environmental assessment and management of environmental issues
9. Evaluate the biodiversity conservation as well as the climate change results in ecosystems and natural environment
10. Strengthen their efficiency to compile information in a coherent system/unit

At the end of this course the student will have further developed the following skills/ competences:

1. Ability to demonstrate knowledge and understanding of essential facts, concepts, principles and theories of Ecology, Evolution, Conservation Biology and Biogeography

2. Ability to apply such knowledge and understanding to the solution of ecological issues
3. Ability to interact with others on environmental multidisciplinary problems
4. Study skills needed for continuing professional development

General Competences

Generally, by the end of this course the student will, furthermore, have develop the following general abilities (from the list above):
Adaptation to new situations
Decision making
Autonomous (Independent) work
Group work
Exercise of criticism and self–criticism
Promotion of free, creative and inductive thinking
Respect to natural environment
Work design and management

3. SYLLABUS

Introductory concepts of species, endemism, and insular ontogeny - Patterns of speciation and endemism. Mechanisms of reproductive isolation. Categories of endemic taxa and how are created. Patterns and hotspots of endemic and total plant diversity at global and local scale. The flora and plant diversity of Greece. The richest families/genera in total number of taxa and in number of endemic taxa in Greece. Morphological features and typical representatives of these. The phytogeographic regions of Greece and their plant diversity. The endemism of the Greek flora. Patterns and causes of endemism in the Greek area. Paleogeography of the Greek area. Altitudinal, insular and continental endemism. Refugia in space and time and how they were created. Extinct, rediscovered and newly described endemic plant taxa of Greece. Top 50 rare Mediterranean plants. Natural and Anthropogenic Extinctions and characteristic examples. Causes and effects of climate change on plant diversity on global and local scale. National and International Legislation for the protection of plant taxa. International Union for Conservation of Nature (IUCN). Red Data Books of Greece. Rare, Threatened and Endangered Endemics of Greece and their distribution. Risk Categories. Greek endemic plant taxa at risk of extinction. Plants of Directive 92/43. Monitoring protocols of the rare, protected, threatened, and endangered species of the Greek flora. Examples from Management Bodies and other research actions. Current situation in the Greek area. Examples of protection of plant taxa. Conservation Biology: history, principles, values and ethics. The Importance and Role of Taxonomy in Conservation Biology. The Importance and Role of Phylogenetics in Conservation Biology. Global Strategy for the Conservation of Plant Diversity. Population conservation biology & Conservation Genetics: Basic concepts. Population viability analysis. Minimum Viable Population. Invasive species and other threats. Conservation measures of endemic, rare, endangered, and protected plant taxa. Ex situ & in situ conservation. Effects of management measures and climate change. Guidelines for the implementation of conservation measures.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Lectures, seminars and laboratory work face to face.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	Use of Information and Communication Technologies (ICTs) (e.g. PowerPoint) in teaching. Support of the learning process through the e–class platform. A series of pdf files, containing each week's lecture, is uploaded in the aforementioned platform; thus, the

	students can have easy and free access to the lecture notes. The students learn up to date widely used software for phylogenetic analysis.	
TEACHING METHODS	***Activity***	***Semester workload***
	Lectures (2 conduct hours per week x 13 weeks)	26
	Field work	8
	Laboratory exercises (3 conduct hours per week x 13 weeks)	39
	Optionally, preparation of home–works from groups of two or three students each	21
	Bibliographical search and study	20
	Hours for private study of the student and preparation of home–works and reports, for the Laboratory, and preparation for the Laboratory (study of techniques and theory)	36
	Course total	**150**
STUDENT PERFORMANCE EVALUATION	Written examination of weekly Laboratory exercises (30%). Preparation and Presentation of group work and Oral Examination (70%). Grade scale: 1-10. Passing grade:5	

5. ATTACHED BIBLIOGRAPHY

Suggested bibliography:

- Stace, C.A. **2003.** Plant Taxonomy and Biosystematics. (Translation in Greek: Economou-Amilli, A.). Press αεί.
- Frankham, R, Ballou, J.D., Briscoe, D.A. **2004.** Introduction to Conservation Genetics. Cambridge University Press.
- Whittaker, R.J. & Fernández-Palacios, J.-M. **2009.** Insular Biogeography. Ecology, Evolution and Conservation (Translation in Greek: Sfenthourakis S.). Crete University Press [Whittaker, R.J. & Fernández-Palacios, J.-M. 2009. Island biogeography. Ecology, evolution and conservation. Oxford University Press]
- Bramwell, D. & Caujapé-Castells, J. **2011.** The biology of island floras. Cambridge University Press.
- Baum, D.A. & Smith, S.D. **2013.** Tree thinking. An Introduction to Phylogenetic Biology. W.H. Freeman and company.
- Primack, R.B. **2017.** Conservation Biology: An Introduction (Translation in Greek: Arianoutsou, M., Dimitrakopoulos, P., Diamantopoulos, I., Valakos, E., Pafilis, P. & Pantis, I.). University Studio Press [Primack, R.B. 2012. A Primer of Conservation Biology. 5th ed. Sinauer Associates Inc.]
- Lomolino, M.V., Riddle, B.R. & Whittaker, R.J. **2017**. Biogeography. Biological diversity across space and time. 5th ed. Sinauer Associates.
- Thompson, J.D. **2020.** Plant evolution in the Mediterranean: Insights for Conservation. (2nd edition). Oxford University Press.

- Phitos, D. & Kamari, G. **2023.** Geobotany lessons. Patras University Press.
Lecture notes in Greek [e–class Advanced topics in Botany] – (BIO357, https://eclass.upatras.gr/courses/BIO521/)