

COURSE OUTLINE

(1) GENERAL

SCHOOL	NATURAL SCIENCES		
ACADEMIC UNIT	BIOLOGY		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	BIO_XAPT	SEMESTER	5/7
COURSE TITLE	Mapping and Assessment of Ecosystems and their Services		
INDEPENDENT TEACHING ACTIVITIES <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i>		WEEKLY TEACHING HOURS	CREDITS
Lectures, seminars, and Multimedia displays		3	6
Laboratory work & exercises		2	
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Field of Science Skills development		
PREREQUISITE COURSES:	Typically, there are not prerequisite course. A good knowledge of the ecology field is recommended.		
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/BIO373/		

(2) LEARNING OUTCOMES

<p>Learning outcomes</p> <p><i>The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.</i></p> <p><i>Consult Appendix A</i></p> <ul style="list-style-type: none"> • <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i> • <i>Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i> • <i>Guidelines for writing Learning Outcomes</i>
<p>By the end of this course the student will be able to:</p> <ol style="list-style-type: none"> 1. Understand the patterns of and identify the spatial distribution of the various ecosystem types 2. Apply methods of qualitative, quantitative, temporal and spatial assessment of ecosystems' condition 3. Identify and assess ecosystems' main services 4. Discuss major theories and concepts of modern perspectives of the contribution of ecosystem services in sustainable management and human well-being 5. Select and implement methods on mapping ecosystem types and their services at different spatial scales

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

1. Ability to identify the various ecosystem types and their main services
2. Ability to assess ecosystems' condition and services
3. Ability to create thematic maps, conduct spatial analyses on ecosystems and their services using Geographic Information Systems (GIS) and compile relevant cartographic studies
4. Ability to formalize scientific and management questions in the field of conservation biology and sustainable management
5. Ability to conduct environmental impact assessments, on ecosystems' condition and services, of the various construction projects and activities

Ability to communicate scientific data and outcomes to decision makers, via their interpretation from the perspective of the ecosystem service concept

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

<i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i>	<i>Project planning and management</i>
<i>Adapting to new situations</i>	<i>Respect for difference and multiculturalism</i>
<i>Decision-making</i>	<i>Respect for the natural environment</i>
<i>Working independently</i>	<i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i>
<i>Team work</i>	<i>Criticism and self-criticism</i>
<i>Working in an international environment</i>	<i>Production of free, creative and inductive thinking</i>
<i>Working in an interdisciplinary environment</i>	<i>.....</i>
<i>Production of new research ideas</i>	<i>Others...</i>
	<i>.....</i>

Generally, by the end of this course the student will, furthermore, have develop the following general abilities (from the list above):

- *Search, analyze and synthesize data and information, using the necessary technologies*
- *Adaptation to new situations*
- *Autonomous (Independent) work*
- *Group work*
- *Working in an interdisciplinary environment*
- *Decision making*
- *Respect to natural environment*
- *Design and project management*

Respect for diversity and multiculturalism

(3) SYLLABUS

1. Introduction to Mapping and Assessment of Ecosystem and their Services – subject of study, terms, historical review of the establishment and integration of the ecosystem services' concept in integrated management and decision making
2. Classification of ecosystem types and of their services: identification, classification methods and categories, main problems and challenges
3. Basic principles and methods of mapping ecosystems types and biophysical parameters.
4. Mapping of ecosystems, vegetation units and habitat types: sampling methods, satellite imagery and remote sensing, photo-interpretation, thematic representations, spatial analyses.
5. Mapping ecosystem services; main mapping methods; What do we choose to map, where, when, and why?
6. Geographic Information Systems (GIS): digital maps compilation, geographic and spatial data types, spatial analyses, geo-databases
7. The value of mapping as a research and decision-making tool.
8. Qualitative and quantitative assessment of ecosystems condition and of their services: ecosystems conservation status assessment methods, identification of the provided services and the demand for services, creation and evaluation of management scenarios.
9. The value of ecosystem services in decision-making: practical applications of mapping and assessing ecosystems and their services.
10. Ecosystem services and protected areas: challenges, opportunities and prospects.
 11. Case-study exercise using Geographic Information Systems (GIS).

(4) TEACHING and LEARNING METHODS - EVALUATION

<p style="text-align: center;">DELIVERY <i>Face-to-face, Distance learning, etc.</i></p>	<p>Lectures, seminars and laboratory work (face to face).</p>	
<p style="text-align: center;">USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i></p>	<p>Use of Information and Communication Technologies (ICTs) (e.g. powerpoint, videos) in teaching.</p> <p>The lectures content of the course for each chapter are uploaded on the internet, in the form of a series of ppt files, where from the students can freely download them.</p>	
<p style="text-align: center;">TEACHING METHODS</p> <p><i>The manner and methods of teaching are described in detail.</i></p> <p><i>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.</i></p> <p><i>The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</i></p>	Activity	Semester workload
	<p>Lectures (3 conduct hours per week x 13 weeks)</p>	39
	<p>Laboratory exercises/ work (2 conduct hours per week x 13 weeks)</p>	20
	<p>Optionally, preparation of home-works from groups of two or three students each.</p>	26
	<p>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)</p>	65
	<p> </p>	<p> </p>
	<p>Course total</p>	150 hours (total student work-load)
<p style="text-align: center;">STUDENT PERFORMANCE EVALUATION <i>Description of the evaluation procedure</i></p> <p><i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<p style="text-align: center;"><i>Written examination at the end of semester (70%)</i></p> <p style="text-align: center;"><i>Laboratory practicum (30%)</i></p>	

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

Dimopoulos P, Kokkoris IP (2017). Mapping and assessment of ecosystem and their services. Katagramma publishing, Kiato, pp. 272 (in Greek). ISBN 978-960-9407-39-7

Burkhard B, Maes J (Eds.) (2017). Mapping Ecosystem Services. Pensoft Publishers,

Sofia, 347pp.

Jacobs S, Burkhard B, Van Daele T, Staes J, Schneiders A (2015). “The Matrix Reloaded”: A review of expert knowledge use for mapping ecosystem services. *Ecol Modell.* 295:21–30.

Haines-Young R, Potschin M (2013). ‘Common Classification of Ecosystem Services (CICES): Consultation on version 4, August-December 2012’, Report to the European Environment Agency [Internet]. [cited 2017 Jan 21]. Available from:

https://www.nottingham.ac.uk/CEM/pdf/CICES%20V43_Revised%20Final_Report_29012013.pdf

Kokkoris IP, Drakou EG, Maes J, Dimopoulos P (2018). Ecosystem services supply in protected mountains of Greece: setting the baseline for conservation management, *International Journal of Biodiversity Science, Ecosystem Services & Management*, 14:1, 45-59, DOI: 10.1080/21513732.2017.1415974

Dimopoulos P, Drakou E, Kokkoris I, Katsanevakis S, Kallimanis A, Tsiafouli M, Bormpoudakis D, Kormas K, Arends J (2017). The need for the implementation of an Ecosystem Services assessment in Greece: drafting the national agenda. *One Ecosystem* 2: e13714. <https://doi.org/10.3897/oneeco.2.e13714>

QGIS training manual https://docs.qgis.org/2.2/en/docs/training_manual/

- *Related academic journals:*

Notes of lecturers (in Greek): <https://eclass.upatras.gr/courses/BIO373/>