

COURSE OUTLINE

RESEARCH METHODOLOGY – QUANTITATIVE ECOLOGICAL METHODS

(1) GENERAL

SCHOOL	TECHNOLOGY		
DEPARTMENT	FORESTRY, WOOD SCIENCES & DESIGN		
LEVEL	POSTGRADUATE		
COURSE CODE	MB115	SEMESTER	1 st
COURSE TITLE	RESEARCH METHODOLOGY – QUANTITATIVE ECOLOGICAL METHODS		
ACTIVITIES		WEEKLY HOURS	ECTS
	Lectures	2	6
	TOTAL	2	6
TYPE OF COURSE	OBLIGATORY		
PREREQUISITES	NO		
LANGUAGE OF TEACHING AND EXAMINATION	GREEK		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	NO		
WEBPAGE COURSE (URL)	https://eclass.uth.gr/courses/FWSD_P_110/		

(2) LEARNING OUTCOMES

Learning Outcomes
<p>The course aims to introduce students to applied research methodology and in particular to natural resource management and the bio-economy. The basic principles of social science research methodology and the design processes of an empirical research are the foundations, so that students can form an overall picture of how to organize a research, what steps to follow in order to reach the final result. In addition, basic and advanced concepts of ecological quantitative methods will be given so that students are familiar with field data analyses.</p> <p>This course is the basic tool for students in the preparation of their thesis in the Master's Study Program. Upon successful completion of the course, the student will be able to:</p> <ul style="list-style-type: none"> • knows the steps he should follow to carry out his research, • is aware of research ethics, • can search for reliable bibliographic sources and conduct an effective literature review; • judge, evaluate and decide which is the appropriate method to provide the appropriate answers to the research questions, • uses the necessary tools to carry out his research, • effectively communicates research ideas and tasks with supervisors and other researchers, and to • is able to write very good research reports and papers
General Skills

(3) COURSE CONTENT

<p>In the theoretical part of the course the student is taught and learns about:</p> <ul style="list-style-type: none"> • Introduction to the course and the basic concepts of research methodology. What is research, basic forms of research, basic research, applied research, research and product development, formulation of the research idea. The research questions, configuration

modes of research question, analytical and inductive research. Qualitative and quantitative research and characteristics, types of variables, types of research (poll, experiment, case study).

- **Critical literature review – Research design.** What is a literature review and what is a critical review, what is a theory, sources for searching bibliographic references, bibliographic references and ways of citing, online bases and sources of bibliographic references, how to cite bibliography within a research text, types of bibliography. Research design and research process steps, research schedule, selection of research object and strategy, selection of research approach.
- **Research ethics – Research design.** Ethics and research, plagiarism, citation of bibliography texts within a research text, intellectual property and research, contribution of authors to research and research work, process of publishing an article, criteria for evaluating a scientific text. Main purpose of a research and individual goals, theoretical background, research materials and methods, research results and their analysis. Research paper writing and its structure and research-scientific texts, design of experiment and case study, structural and conceptual validity of research. Choice of data collection tool, pros and cons of individual tools and methods of use.
- **Sample selection.** Basic concepts of sampling, population, sample, statistical methods of sampling (simple – systematic – stratified), standard deviation, distributions. Qualitative and quantitative characteristics of a sample, population segmentation and sample selection.
- **Collection of primary data.** What is primary data, ways and tools to collect primary data, questionnaires and experimental measurements (and field measurements), recording, storing and processing primary data in SPSS.
- **Collection of secondary data.** What is secondary data, sources of secondary data extraction, statistics and database websites, reliability of studies as sources of secondary data, online libraries.
- **Writing and using a questionnaire.** The questionnaire as a data collection tool, advantages and disadvantages of using a questionnaire, writing and structure of a questionnaire, types of questions (categorical, dichotomous, ranking, Likert, open-closed), language and length of the questionnaire, wording of questions, checking of structural and conceptual validity of a questionnaire, pre-questionnaire, questionnaire development in electronic form.
- **Data processing using statistical programs – Analysis of qualitative and quantitative data.** Structure and environment of SPSS, entry, storage and analysis of data in SPSS, choice of statistical analysis (descriptive, correlations, regressions, analysis of variance, factor and cluster analysis, etc.) extraction of results, interpretation of results – connection to the research questions, construction diagrams. Differences between quantitative and qualitative data, collecting qualitative data using questionnaires, interpreting qualitative data. Delve into the statistical analysis of quantitative data.
- **Sampling populations.** Introduction. The optimal sample size. Special cases of discontinuous distributions. Alternative estimation methods. Hierarchical sampling with equal number of replications. Hierarchical sampling with unequal number of replications. Area sampling. Introduction to the concept of geostatistics.
- **Ecological diversity.** Introduction. Demarcation of biodiversity research. Biocommunity species richness. Diversity indices. Kempton and Taylor diversity index. Finite set diversity index. Diversity in a two-classification system. Hierarchical diversity. Diversity marker families of M.O. Hill. The log-rank parameter α as an index of diversity. Evenness indices. Alpha-beta-gamma diversity. Diversity and spatial planning. Applications – Importance of diversity. Fractals.
- **Relationship between species in space.** Introduction. Qualitative presence-absence data. Quantitative data. Investigation of response of qualitative and quantitative coefficients. Presentation of individual student works.

- **Similarity of biocommunities.** Introduction. Coefficients of similarity - dissimilarity. Classification of samples. Prioritizing samples. Correspondence Analysis. Discriminant function analysis or Discriminant Ordination. Presentation of individual student works.
- **Compilation and presentation of a research project report.** The diploma thesis and the scientific work. Structure of scientific papers and theses, summary writing, key words, chapters in a diploma thesis, content of each chapter, appendices, submission of a scientific paper and publication process in a scientific journal, presentation of work, practical exercises on scientific papers. Presentation of individual student works.

From the 1st lesson, a suggested list of assignments is given that the student should undertake and prepare (individually) until the end of the MSc semester.

The relevant directions are given, while rich material and instructions are posted in the E-class of the course that will be created.

The final assignment includes, in addition to paper and electronic delivery, a public oral presentation on the chosen topic, on a set date (usually the 12th or 13th week of classes). The presentation lasts 15 minutes and is followed by 5 minutes of questions from the students present. The teacher intervenes - if necessary - for comments, observations, corrections.

Students are graded on the overall performance of their final paper: 70% on content and editorial specifications and 30% on the preparation of the online presentation and its oral support.

These grades are counted as a total of 40% of the general grade that the students will receive after the final written examination of the theory.

(4) TEACHING AND LEARNING METHODS - EVALUATION

COURSE DELIVERY METHOD	In class and remotely	
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	<ul style="list-style-type: none"> • Use of PCs, ppt slides, projector • Learning process support through the e-class electronic platform • Interactive Whiteboard • Eight (8) PCs in the Laboratory to exercise students in a questionnaire processing program 	
MANAGEMENT OF TEACHING	Activity	Semester Workload
	Lectures	26
	Small individual practice tasks	20
	Final work	60
	Independent Study	44
	Course Total (25 workload hours per credit unit)	150
STUDENT EVALUATION	<p>I. Written final exam (60%) including:</p> <ul style="list-style-type: none"> • Short answer questions from all the material of the book and lectures. • Critical presentation questions and solving various research problems. <p>II. Presentation of Individual Work (40%).</p>	

(5) RECOMMENDED-BIBLIOGRAPHY

- *Suggested Bibliography:*

Babbie E. 2011. Εισαγωγή στην κοινωνική έρευνα, Εκδόσεις Κριτική.

Begon M., R.W Howarth and C.R. Townsend. 2015. Πληθυσμοί, βιοκοινότητες και εφαρμογές. Γενική επιμέλεια: Σ. Σγαρδέλης, Π. Δημόπουλος και Σ. Πυρίντσος. Εκδόσεις Utopia.

Bell J. 2007. Πώς να συντάξετε μια επιστημονική εργασία: Οδηγός ερευνητικής μεθοδολογίας, Εκδόσεις Μεταίχιμο.

Mason J. 2003. Η διεξαγωγή της ποιοτικής έρευνας, Εκδόσεις Γράμματα.

Δημητρώπουλος Ε. 2009. Εισαγωγή στη μεθοδολογία της επιστημονικής έρευνας: Προς ένα συστημικό δυναμικό μοντέλο μεθοδολογίας επιστημονικής έρευνας, Εκδόσεις Ελλην.

Ζαφειρόπουλος Κ. 2005. Πως γίνεται μια επιστημονική εργασία, Εκδόσεις Κριτική.

Ιωσηφίδης Θ. 2008. Ανάλυση ποιοτικών δεδομένων στις κοινωνικές επιστήμες, Εκδόσεις Κριτική.

Μάντζαρης Ι. 2012. Επιστημονική έρευνα, Αυτοέκδοση.

Μπουρλιάσκος Β. 2010. Πως γράφεται μια επιστημονική εργασία: Συγγραφή.

Ρήγας Γ. και Ι. Βαγγέλας. 2018. Βιομετρία. Εκδόσεις Utopia.

Τσιώλης Γ. 2014. Μεθοδολογία και τεχνικές ανάλυσης στην ποιοτική κοινωνική έρευνα, Εκδόσεις Κριτική