

Introduction to R Programming Language for Data Science [2000]

COURSE OUTLINE

(1) GENERAL

SCHOOL	ANIMAL BIOSCIENCES		
ACADEMIC UNIT	DEPARTMENT OF ANIMAL SCIENCE		
LEVEL OF STUDIES	Undergraduate [Free Elective]		
COURSE CODE	2000	SEMESTER	8 th
COURSE TITLE	INTRODUCTION TO R PROGRAMMING LANGUAGE FOR DATA SCIENCE		
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 (ECTS)
Theory: Lectures		2	2
Laboratory: Use of Software Tools		3	3
Total		5	5
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>	Scientific Area (M4.017), Skills Development		
PREREQUISITE COURSES:	-		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS:	Yes (in Greek)		
COURSE WEBSITE (URL):	https://oeclass.aua.gr/eclass/courses/6120/		

(2) LEARNING OUTCOMES

Learning outcomes	
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. Consult Appendix A • Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area • Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B • Guidelines for writing Learning Outcomes	
Upon successful completion of the course, students will be able to: - understand the basic principles of the R language and its use in Data Science. - perform data processing and statistical analysis tasks using the R language. - apply data analytics techniques. - organize and process data with the help of appropriate data structures. - manage big data using R's built-in libraries. - create graphs and visualize data.	
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?	
Search for, analysis and synthesis of data and information, with the use of the necessary technology Adapting to new situations Decision-making Working independently Team work Working in an international environment Working in an interdisciplinary environment Production of new research ideas	Project planning and management Respect for difference and multiculturalism Respect for the natural environment Showing social, professional and ethical responsibility and sensitivity to gender issues Criticism and self-criticism Production of free, creative and inductive thinking Others...
- Search, analysis and synthesis of data and information by use of the necessary technologies. - Adaptation to new situations.	

- Decision making.
- Individual work.
- Work in a multidisciplinary environment.
- Development of judgment and self-judgment.
- Advancement of free, creative and deductive thinking.

(3) SYLLABUS

Theory

1. Introduction to the R language for Data Science
2. Data Types, Numeric and Logical Operators
3. Control Structures, Data Structures
4. Functions, Packages
5. Introduction to Exploratory Data Analysis
6. Data Preprocessing and Quality
7. Descriptive Statistics, Data Visualization
8. Correlation Analysis
9. Special Topics in Machine Learning and Artificial Intelligence

Laboratory

- Familiarization with RStudio.
- Examples in the analysis of actual datasets in agricultural economics, as well as in plant and animal production.

(4) TEACHING and LEARNING METHODS - EVALUATION

TEACHING METHOD <i>Face-to-face, Distance learning, etc.</i>	In Classroom and in Laboratory (face-to-face).	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	Exploitation of Information and Communication Technologies in teaching, in laboratory training and in the communication with students. Use of the open-source R compiler and the corresponding RStudio development environment. Use of integrated e-learning system. Communication with students via open eclass platform and e-mail.	
TEACHING METHODS <i>The manner and methods of teaching are described in detail. 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> <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>	Activity	Semester workload
	Lectures	26 hours
	Laboratory work	39 hours
	Group and/ or individual projects	15 hours
	Individual study	45 hours
	Course total (25 h of workload per ECTS)	125
STUDENT PERFORMANCE EVALUATION <i>Description of the evaluation procedure</i> <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> <i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i>	I. Final written examination (50%): Writing a computer program that solves a practical data analysis problem. It also includes short essay questions. II. Laboratory exercises (50%): Writing simple programs related to the material taught. The final grade is common for theory and laboratory and is calculated as the sum of the above individual assessments. Rating Scale: 0-10 Minimum Grade: 5 The assessment criteria are explicitly defined and can be found on the eClass page of the course. Students can have access to their written examination and software code. If required, students' evaluation can also be realized remotely through the eClass platform for the written examination, and through video conferencing tools for presentation of projects or oral examinations.	

(5) ATTACHED BIBLIOGRAPHY

1. Nikolaou, Ch. Data Analysis with the R Language. Disigma Publications, 2023.
2. Verykis, V., Kaglis, V., and Stavropoulos, I. Data Science through the R Language (e-book). Association of Greek Academic Libraries. Kallipos Repository, 2015.
3. Wickham, H., Grolemund, G. R for Data Science. Kleidarithmos Publications, Edition: 1st/2022.