Syllabus

Kursbeschreibung

Titel der Lehrveranstaltung	Environmental data analysis
Code der Lehrveranstaltung	47068
Zusätzlicher Titel der Lehrveranstaltung	
Wissenschaftlich-disziplinärer Bereich	NN
Sprache	Englisch
Studiengang	Master in Umweltmanagement in Bergregionen
Andere Studiengänge (gem. Lehrveranstaltung)	
Dozenten/Dozentinnen	dr. Giuseppe Roberto Pisaturo, GiuseppeRoberto.Pisaturo@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/38803
Wissensch. Mitarbeiter/Mitarbeiterin	
Semester	Erstes Semester
Studienjahr/e	1
KP	3
Vorlesungsstunden	20
Laboratoriumsstunden	10
Stunden für individuelles Studium	45
Vorgesehene Sprechzeiten	9
Inhaltsangabe	- Ability to manage, analyse and interpret data and to present them graphically - Learn specialised statistical software and functions to perform data analysis - Ability to apply theoretical and empirical models to a real-world context - Ability to interpret the results of environmental analysis and draw

	appropriate conclusions
Themen der Lehrveranstaltung	- Descriptive Statistics: Measures of central tendency and dispersion, data visualization, and exploratory data analysis techniques applied to environmental datasets. - Introduction to Probability: Basic probability concepts, random variables, and the role of probability in quantifying uncertainty in environmental systems. - Statistical Distributions: Common discrete and continuous probability distributions (e.g., Normal, Poisson, Exponential) and their environmental applications. - Confidence Intervals: Estimation of population parameters and interpretation of confidence intervals for mean, proportion, and variance. - Hypothesis Tests: Principles and procedures of hypothesis testing, including t-tests, chi-square tests, and non-parametric methods, with a focus on environmental case studies. - Singular and Multiple Linear Regression Models: Model formulation, parameter estimation, diagnostics, and interpretation for predicting and understanding environmental processes.
Stichwörter	Statistic, distribution, interpretation, correlation
Empfohlene Voraussetzungen	no prerequisites
Propädeutische Lehrveranstaltungen	No
Unterrichtsform	Lecture materials will be provided to the students by the teachers and will be as well proposed and discussed as class lectures utilizing both blackboard and slides. Calculations and design methods will be used to integrate the class lectures with the use, for some applications, of suitable software.
Anwesenheitspflicht	No
Spezifische Bildungsziele und erwartete Lernergebnisse	Ability to apply knowledge and understanding --> Knowledge and learning abilities are achieved through course attendance, practical activities both in the field and in the

	laboratory and through personal study. The achievement of the learning objectives will be tested through oral and/or written examinations, as well as through the guided preparation of seminars on topics specific to the Master's degree. The tests (written and oral examinations, reports) and exercises involve the performance of specific tasks in which the student demonstrates mastery of tools, methodologies and critical autonomy. Learning capacity --> The graduate will have the ability to learn by synthesising the notions learnt in the course of studies, in order to address complex design issues, by expanding and updating the knowledge and technical skills acquired by using analysis, design and management tools appropriate to the situations in which the graduate operates. The graduate will be able to manage the different information networks in order to be able to continue to learn and thus to update himself/herself for his/her own cultural improvement and professional advancement. In addition, the graduate will be able to identify the appropriate training tools and paths for the development of their own cultural and specialist knowledge. Learning skills are attained during all phases of the course of study. The Master's degree course enables students to consolidate their self-study skills, especially when they carry out group work on proposed topics; again, this ability is enhanced during a compulsory course, which involves group work, and subsequently in the preparation of the final thesis of an experimental nature. In particular, this practical course requires students to work in small groups (3-5) on a project (e.g., rural development plan for a mountainous area, rehabilitation project for a degraded terrestrial or river ecosystem) from its initial stages (identification of objectives, conceptual development of actions, collection of available data) through to interaction with the various stakeholders and communication activities towards society. The projects will take place under the supervision of two or more professors from the two universities involved, but also by having the students interact with professional firms and/or public technical offices that have already expressed interest and willingness to do so. Learning ability is assessed through continuous forms of verification during the training activities and during the conduct of

	the activity related to the final examination.
Spezifisches Bildungsziel und erwartete Lernergebnisse (zusätzliche Informationen)	
Art der Prüfung	The assessment is based on the presentation of the project regarding a topic of interest for the student. The purpose is let the students to choose an "environmental question" that involves the use of statistic to interpreted the data. The students will present they results with a PPT presentation (15 min max). For he theoretical part will be organized a written exam. The questions aim at evaluating both the basic and applied knowledge acquired during the course. Particular attention is paid to verifying the capability of the student to critically discuss the analysis they performed. Furthermore, the evaluation is extended to test the global competences of the topic issue proposed during the course. For students that can't be present at the written exam, will be organized a oral session. - Formative assessment (assessed ILOs: 2, 3, 5): - Analysis and discussion of the criteria to be adopted to analyse a environmental problem from a data analysis point of view; - discussion of the basic elements of the project; - interactive classroom questions pertaining both the relevant topics of the selected projects and the main subjects of the course: during the entire duration of the course; - Summative assessment (assessed ILOs: 1,2,3,4): Presentation of the project based on the discussion of the topics a), b), c), d) indicated in the following section: About 15 minutes following the schedule exam sections.
Bewertungskriterien	The final mark will be determined as an average of the mark evaluation referred to the selected project elaboration (20/30) and the mark of the written/oral (10/30) presentation and discussion. The global mark must be at least 18. The oral exam is focused on testing the knowledge (80%) of the topic's issues proposed during the course, the capability of providing a critical overview of the choices adopted for the selected project. Furthermore, further aspects like clarity of presentation,

	correctness in use of technical terms and language, capability of providing simply numerical elaborations, is constitutive (20%) of the oral mark. The project evaluation is dedicated to testing the capability of the student in the following topics: a) fundamental knowledge and applications of the procedures studied in the selected project. b) critical evaluation of the consistency between the preliminary analysis and the obtained results of the project elaborations. c) the completeness of the data elaboration d) novelties and originality introduced in different steps of the global development of the project. The awarding marks are equally subdivided among the indicated points of the evaluation.
Pflichtliteratur	David S. Moore, George P. McCabe and Bruce A. Craig - Introduction to the practice of Statistics. ISBN 978-1-319-38366-4, Macmillan Learning
Weiterführende Literatur	
Weitere Informationen	
Ziele für nachhaltige Entwicklung (SDGs)	Hochwertige Bildung, Menschenwürdige Arbeit und Wirtschaftswachstum, Leben an Land, Maßnahmen zum Klimaschutz, Leben unter Wasser, Nachhaltige Städte und Gemeinden