

## Syllabus

### Course description

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| <b>Course title</b>      | Applied statistics and computer programming for environmental modelling |
| <b>Course code</b>       | 47053 A Applied Statistics  |
| <b>Scientific sector</b> | SECS-S/02   |
| <b>Degree</b>            | Environmental Management of Mountain Areas                              |
| <b>Semester</b>          | I   |
| <b>Year</b>              | I   |
| <b>Academic year</b>     | 2022/2023   |
| <b>Credits</b>           | 3   |
| <b>Modular</b>           | yes   |

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| <b>Total lecturing hours</b> | 20   |
| <b>Total lab hours</b>       |  |
| <b>Total exercise hours</b>  | 10   |
| <b>Attendance</b>            | Not required, but strongly suggested   |
| <b>Prerequisites</b>         | Basic statistics at a Bachelor course level  |
| <b>Course page</b>           | <a href="#">Course Offering - enrolled from 2021 / Free University of Bozen-Bolzano (unibz.it)</a> |

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| <b>Specific educational objectives</b> | <p>The module aims to develop specific skills in applied statistics research through a mix of lectures, computer classes and team assignments where each topic is addressed in methodology and application. The intention is to provide a description of a number of different methods, tools and examples of how they may be applied to ecological, engineering and socio-economic of mountain landscape management problems for the collection and analysis of data.</p> <p>More specific education objective include:</p> <ul style="list-style-type: none"> <li>- Ability to manage, analyze and interpretate data and to present them graphically;</li> <li>- Learn specialised statistical software and functions to perform data analysis;</li> <li>- Ability to apply theoretical and empirical models to a real world context.</li> <li>- Ability to interpret the results of environmental analysis and draw appropriate conclusions.</li> </ul> |
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| <b>Lecturer</b>                          | Menapace Andrea                                    |
| <b>Scientific sector of the lecturer</b> | ICAR/01-02   |
| <b>Teaching language</b>                 | English  |
| <b>Office hours</b>                      | Monday, 2pm – 6pm To be previously agreed by email |
| <b>Teaching assistant (if any )</b>      | -  |
| <b>Office hours</b>                      | -  |

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| <b>List of topics covered</b> | <p>Introduction to descriptive statistics and probability<br/>         Random variables discrete and continuous<br/>         Confidence intervals<br/>         Hypothesis testing<br/>         Correlation and linear regression</p> |
| <b>Teaching format</b>        | Lectures, practical labs, group project, face-to-face coaching and mentoring.  |

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| <b>Learning outcomes</b> | <p><b>Knowledge and understanding</b><br/>         Knowledge of linear regression analysis, the most important statistical tests and confidence intervals understanding their rationale, conditions of usage and their results.</p> <p><b>Applying knowledge and understanding</b><br/>         Identification of appropriate statistical method for data analysis; independent application of tests using software package R.</p> <p><b>Making judgements</b><br/>         Critical reviewing of own scientific work, interpretation of statistical analyses in the context of environmental sciences.</p> <p><b>Communication skills</b><br/>         Ability to present the results of statistical analyses in a correct and comprehensible manner, together with the ability to discuss and argue their theses.</p> <p><b>Learning skills</b><br/>         Ability to recognise situations where statistical analysis is required. Ability to judge the appropriateness of statistical methods, even if not explicitly covered in this course.</p> |
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| <b>Assessment</b>  | <p>Written exam and assignment<br/>         Assignment carried out in groups (2-3 persons) and presented in the form of an oral presentation (20 minutes).<br/>         Written exam includes questions and exercises to test the knowledge of theory and application skills (1 hour exam).</p>   |
| <b>Assessment language</b>                                 | English   |
| <b>Evaluation criteria and criteria for awarding marks</b> | <p>Final mark is a sum of marks from the group assignment and a written exam.</p> <p>Student will analyse environmental in mountain context problems in both academic and practical contexts, displaying effective quantitative problem-solving skills. With a clarity of answers and mastery of research method, ability to collect and process the data, make critical comparisons and judgements, summarize, establish and</p> |

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|                                      | <p>measure the relationships within the project. An assignment also test student's ability to work in a team, creativity, IT and communication skills, critical thinking, cooperation and demonstrate individual's reflection and judgement.</p> <p>The written exam and the assignment will both be worth 50% of the final grade.</p> |
| <p><b>Required readings</b></p>      | <p>Teacher's slides and R scripts in the electronic reserve collection.</p> <p>David S. Moore, George P. McCabe and Bruce A. Craig - Introduction to the practice of Statistics. ISBN 978-1-319-38366-4, Macmillan Learning.</p>   |
| <p><b>Supplementary readings</b></p> | <p>Christian Heumann and Michael Schomaker<br/>         Shalabh - Introduction to Statistics and Data Analysis With Exercises, Solutions and Applications in R. ISBN 978-3-319-46160-1, Springer.</p>  |