Syllabus
Course description

Course title	Statistics
Course code	43078
Scientific sector	SECS-S/02
Degree	Bachelor in Industrial and Mechanical Engineering
Semester	I
Year	(optional)
Academic year	2021/2022
Credits	3
Modular	No

Total lecturing hours	18
Total lab hours	
Total exercise hours	12
Attendance	Not required, but strongly suggested
Prerequisites	Basic Math at a Bachelor course level
Course page	See ole.unibz.it

Specific educational objectives	Applied Statistics: The course is designed for acquiring professional skills and knowledge. The students will be able to: • analyze their own data statistically and to present them graphically • judge critically scientific results and conclusions • use specific functions of the statistical software package R • apply methods of inferential statistics

Lecturers	Fabiola Del Greco M.
Scientific sector of the lecturer	SECS-S/02
Teaching language	English
Office hours	See Timetable on unibz web page
Teaching assistant (if any)	
List of topics covered (Applied Statistics)	1. Introduction to descriptive statistics and probability 2. Random variables discrete and continuous 3. Confidence intervals 4. Hypothesis testing 5. Correlation and linear regression
Teaching format (Applied Statistics)	Frontal lectures, exercises on the PC with R
Learning outcomes	**Knowledge and understanding** Knowledge of the most important statistical tests, understanding their rationale, conditions of usage and

their results.

Applying knowledge and understanding
Identification of appropriate statistical method for data analysis; independent application of tests using software package R.

Making judgements
Critical reviewing of own scientific work and of original publications; interpretation of statistical analyses in the context of environmental sciences.

Communication skills
Ability to present results of statistical analyses correctly and intelligibly at the level of scientific publications.

Learning skills
Ability to recognize situations in which statistical analysis is necessary. Ability to judge the appropriateness of statistical methods, even if not explicitly treated in this course.

Assessment	Written exam and Project work. The length of the written exam will be 90 minutes. This will include 8/10 questions (that is exercises and theory questions) which will allow to reach a maximum of 30 points. The student will be allowed to consult only a sheet of formulas and use a calculator to perform simple calculations. The ability to accurately trace the solution will be more important than the final calculation result. The programming language R will not be concretely examined. However, the student may be asked to correctly interpret numerical and graphical outputs generated using R. The Project work will consist of a small individual applied project with real data to describe and analysis, that should be presented with 4 slides (1. Data and scientific hypothesis to be analyzed; 2. Method used; 3. Results; 4. Conclusions).
Assessment language	English
Evaluation criteria and criteria for awarding marks	The written exam will be the 80% of the final grade; the Project work will be the 20% of it. The written exam will be pass if the student reach at least 18 points over 30. In the Project work, the ability to identify a scientific hypothesis and the appropriate statistical method, and the ability to synthesize and present data and results, will be evaluated.

Required readings	Teacher's slides in the electronic reserve collection. Heumann, Christian/ Schomaker, Michael/ Srivastava,

	Shalabh. Introduction to Statistics and Data Analysis: With Exercises, Solutions and Applications in R, Part I (2016). Web. ISBN 3-319-46162-1, Springer International
Supplementary readings	James, Witten, Hastie, Tibshirani. An Introduction to Statistical Learning with Applications in R, Springer 2013, freely available at http://www-bcf.usc.edu/~gareth/ISL/index.html