

## OVERVIEW OF THE COURSE: Production process control

Module of: ..... (not applied - if the course does not include modules) .....

Study programme name

Course

X Master degree

A.A. 2019/20

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SSD SEC-S/01

CFU 5

Year 1

Term I

**Prerequisites:** No formal prerequisites are expected. However, a basic knowledge of elementary calculus is assumed.

### EXPECTED LEARNING RESULTS/RISULTATI DI APPRENDIMENTO ATTESI

<b>Knowledge and understanding skills/Conoscenza e capacità di comprensione</b>
<u>Cognitive / Knowledge skills</u>
<ul style="list-style-type: none"> <li>Develop an understanding of the basic concepts of applied statistics, both in terms of data analysis, statistical inference and statistical modelling.</li> <li>Evaluate the quality of the data at hand.</li> <li>Understand the different roles each technique may have within a statistical analysis.</li> <li>Be able to understand the main fact (data, methods, results) within an empirical study.</li> </ul>
<b>Applied knowledge and understanding skills/Conoscenza e capacità di comprensione applicate</b>
<u>Analytical / Critical Thinking Skills (Oral &amp; Written)</u>
<ul style="list-style-type: none"> <li>Develop the ability to understand to what extent statistical tools may provide answers to empirical questions.</li> <li>Ascertain whether a theoretical model has an empirical foundation, given a proper dataset.</li> <li>Estimate the parameters of a model, given a proper dataset.</li> <li>Analyzing a relationship between some variables, given a proper dataset.</li> <li>Critical assess the strength of an empirical study.</li> </ul>
<b>Any further learning outcomes expected in relation to/Eventuali ulteriori risultati di apprendimento attesi, relativamente a</b>
<ul style="list-style-type: none"> <li><b>Autonomy of judgment/Autonomia di giudizio:</b> ability to choose the methods and models according to the application framework, the main aim of the study and the available data.</li> <li><b>Communication skills/Abilità comunicative:</b> ability to present and defend an empirical study.</li> <li><b>Learning skills/Capacità di apprendimento:</b> ability to critically read an empirical study.</li> </ul>

### COURSE MAIN CONTENTS/PROGRAMMA

Aim of the course is to provide students with a broad overview of statistical methods and models which may be exploited to face with real life applications. The exploratory data analysis and model building perspective is adopted. Room is devoted to applications and case studies. Students will learn statistics by doing, exploiting R, a popular open-source software for data analysis. Emphasis on the applications of the techniques and on the interpretation of results will help students to appreciate the relevance of the statistical tools in their study context.

**Exploring and collecting data:** survey and sampling, displaying and describing categorical data, displaying and describing numerical data, displaying and describing association between two variables.

**Modelling with probability:** probability, random variables and probability models, sampling distribution.

**Inference for decision making:** confidence intervals for proportions for one and two populations, confidence intervals for mean (one and two populations), confidence intervals for variance (one and two populations), testing hypothesis, comparing two groups (in mean, variance and proportions), inference for more than two means, inference for counts, basic nonparametric methods, bootstrap and resampling methods.

**Models for decision making:** association and correlation, regression model (simple and multiple), inference for regression, diagnostic measures. Further regression analysis: logistic regression, Poisson regression, regression for clustered data

### COURSE MATERIAL

- Reference textbook:  
Statistics for Veterinary and Animal Science, Third Edition, Petrie A. and Watson P., Wiley-Blackwell (2013)
- Lecture notes provided during the course

### TARGET AND MODALITY AIMED TO ASSESS THE LEARNING RESULTS

**a) Learning results to be verified/Risultati di apprendimento che si intende verificare:**

Ability to carry out an empirical study.

**b) Assessment method/Modalità di esame:**

<b>Examination includes</b>	<b>Written test and oral</b>	<b>x</b>	<b>Written test</b>	<b>x</b>	<b>Oral</b>	<b>x</b>
<b>Project report discussion</b>						
<b>Other procedures (specify)</b>	<b>Homework</b>	<b>x</b>				
<b>Written test - questions ask for (*)</b>	<b>Multiple answers</b>		<b>Free answers</b>	<b>x</b>	<b>Numerical exercises</b>	<b>x</b>