**Università degli Studi della Basilicata**

**DIPARTIMENTO DI MATEMATICA, INFORMATICA ED ECONOMIA**

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| COURSE: **STATISTICAL METHODS FOR MANAGEMENT** | | | |
| ACADEMIC YEAR: 2018/2019 | | | |
| TYPE OF EDUCATIONAL ACTIVITY: Basic/Characterizing | | | |
| TEACHER: DOMENICO PICCOLO | | | |
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| phone: 081-2537461 | | mobile (optional): | |
| Language: Italian | | | |
| ECTS: 8 | n. of hours: 64 | Campus: Potenza<br>Dept.: DIMIE<br>Program: Economics & Management | Semester: II |

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

This course is the unique teaching opportunity for students of the Program in "Economics & Management" to learn foundations of statistical methods for achieving important knowledge and skills useful to investigating real data.

KNOWLEDGE: The main knowledge concerns random sampling, inferential methods and statistical models aimed to discover interpretation and meaning from real data set. More specifically, large space is devoted to regression models and their variants both with numerical and qualitative variables. The open-source software R will be the computational tools for all the analysis

SKILLS: The student will be able to analyze management data by identifying meaningful objectives, trasforming such information in statistical problems, solving them and checking the adquacy of the proposed solutions.

LEARNING RESULTS ACCORDING DUBLINO DESCRIPTORS:

*Knowledge and understanding:* By the end of the course, the student is able to manage inferential methods of Statistics in order to transform a real problem into a statistical one and interpret results in an effective way. Moreover, it is expected that the student is able to employ statistical models for a better identification of the dependence among real phenomena, both quantitative and qualitative. Computational skills will be acquired by means of the open source software R.

*Applying knowledge and understanding:* The aim of the course is to give the student the ability to analyze real data matrices, sketch out information and build statistical models so as to explain significant relationships among variables. The student is requested to be able to set out statistical models in order to make evidence of relations among variable for individual and collective data consisting of quantitative and qualitative variables.

*Making judgements:* By comparing the results arising from the methods and aiming to perform a statistical analysis, the student has to be able to select which variables are most significant among the ones generating the experimental data, and which model better describes the dependence among the observed phenomena, also when they consist of qualitative and ordinal descriptors.

*Communicative skills*: The student must be able to communicate the information obtained from the performed qualitative and quantitative analysis by using the most appropriate terminology and the most useful graphical tools according to Statistics and aimed to: a) avoid possible distortions; b) optimize their use; b) validate the analysis.

*Learning skills:* The course contents are commensurate to the number of credits. The student must prove the knowledge of these contents and manage the statistical techniques proposed during the course. An important aspect will the ability to adequately manage the main tools offered by the open source software R in facing the main statistical problems when referred to the managerial environment.

PRE-REQUIREMENTS

For a full comprehension of the course, some prerequisites of Mathematics and Linear Algebra are strictly requires. Then, some skills to manage rational facts according to a deductive and formal logics are mostly suitable to optimize

learning. Students are warmly encouraged to attend all the lectures and to study in sequential steps.

SYLLABUS

1. Main objectives of the course. Exploratory analysis of data (3 hours)
2. Foundations of probability and random variables theory (3 hours)
3. *Foundation of programming in R: part I* (3 hours)
4. Random sampling and statistical inference (3 hours)
5. Estimation theory (3 hours)
6. Test of statistical hypotheses (4 hours)
7. Confidence intervals (2 hours)
8. *Foundation of programming in R: part II* (3 hours)
9. Classification of statistical models (2 hours)
10. Simple regression model (3 hours)
11. Multiple regression model (4 hours)
12. Variants of regression models (3 hours)
13. Modells with qualitative regressors (3 hours)
14. *Foundation of programming in R: part III* (3 hours)
15. Logistic regression models (3 hours)
16. Qualitative data analysis (3 hours)
17. *Foundation of programming in R: part IV* (3 hours)
18. Ordinal data models: classical approach (2 hours)
19. Ordinal data models: new paradigms (4 hours)
20. *Analysis of real case studies in R: part V* (7 hours)

***--- A very detailed program will be available at the end of the lectures and will be delivered (even by Email) to all the students. This detailed program is the basis for the examination questions.***

TEACHING METHODS

The course consists of 64 hours of class lectures: 45hours will be devoted to the presentation of theory, methods and problems and 19 hours will be devoted to experimental exercises by using the Open Source software R. It is suggested that each student will use own PC running R during these exercises for a better efficacy.
Given the deductive nature of the discipline and the sequential presentation of methods, it is warmly suggested to attend all the lectures and to study consistently and on a regular basis.

EVALUATION METHODS

The examination check should verify the achievement of the educational objectives with reference to Syllabus.
The examination consists in an oral discussion with contextual written solutions of the questions by the students with pen and paper. The student will explain the methodological content of the problem, the proposed methods to solve it and some real situations where it may be consistently applied.
The examination consiste in three questions relates to Part I (1-8), Part II (9-12) and Parte III (13-20), respectively, of the Syllabus. If the examination is not passed, the next examination will concern the whole programme.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

- Topics 1-10, 14, 17 and 20: D. Piccolo, STATISTICA PER LE DECISIONI, il Mulino editore, ultima edizione
- Topics 11-13, 15-16 e 18-19: Teacher slides will be available during the course
- An English text (without R) may be: R.I. Levine, D.R. Rubin, M.H. Siddiqui, S. Rastogi, STATISTICS FOR THE MANAGEMENT, Pearson, 8th edition

INTERACTION WITH STUDENTS

*At the beginning of the course, teacher will inform students about objectves of the course, syllabus, texts, examination modalities and relationships between students and teacher. Support material will be distributed during the course. During the period of the course, the office hours for students is Tuesday from 15:00 to 18:00 at teacher office (II floor of DIMIE). In the other periods, it is suitable to contact the teacher by using the Email: domenico.piccolo@unina.it*

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| EXAMINATION SESSIONS (FORECAST)[1]<br>8 February; 22 Mars; 17 May; 5 July; 19 July 13 September; 22 November, 2019 |
| SEMINARS BY EXTERNAL EXPERTS YES □ NO X |
| FURTHER INFORMATION |

[1] Subject to possible changes: check the web site of the Teacher or the Department/School for updates.