STATISTICS APPLIED TO PSYCHOLOGY II– Code 800147

Academic Year 2018-19

COURSE INFORMATION

Undergraduate Studies: 0812 – Degree in Psychology (Studies Plan 2009-10)
Type: Compulsory
ECTS: 6.0
Module: Basic training
Area: Statistics
Year: First
Semester: 2

LECTURER INFORMATION

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Office hours (spring semester): Tuesdays from 12.00 to 13.00 and 15.30 to 17.30. Thursdays from 15.30 to 17.30.

SYNOPSIS

COMPETENCIES

General competencies

GC6: Know and understand research methods and data analysis techniques.
GC14: Prepare oral and written psychological reports in different areas of activity.

Transversal competencies

TC1: Analysis and synthesis.
TC2: Preparation and defence of properly reasoned arguments.
TC5: Looking for information and data interpretation on social, scientific and ethical topics related to the field of Psychology.
TC6: Team work
TC7: Critical thinking and self- analysis.
TC8: Learning how to learn, skills for life-long learning.
TC9: Communication skills, learning how to communicate ideas to both, professional and non-professional audiences.

Specific competencies

SC17: Be able to measure and obtain relevant data for the evaluation of interventions.
SC18: Know how to analyse and interpret results of evaluations.
SC19: Know how to appropriately and accurately provide feedback to recipients.

TEACHING ACTIVITIES

TEACHING ACTIVITIES	Hours	% of total credits	Attendance
Theory classes	45	30 %	100%
Practical sessions	15	10 %	100%
Students' work	82.5	55 %	0%
Assessment	7.5	5 %	100%

BRIEF DESCRIPTION

Introduction to statistical hypothesis testing (p-values & alpha levels, effect sizes, power analysis). Hypothesis testing for different parameters. General lineal model: ANOVA, ANCOVA, and lineal regression. Analysis of categorical data (contingency tables). Introduction to non-parametric statistics.

PRE-REQUISITES

From an administrative point of view, Statistics I and II are two completely independent courses and students who have failed Statistics I can still take and pass Statistics II. However, Statistics II builds on skills and key concepts learned in Statistics I. Hence, a reasonable understanding of the material covered last semester is indispensable to succeed here.

OBJECTIVES

This course aims at providing students with a basic toolbox on statistical inference and with the skills required to use the most widespread quantitative data-analysis techniques in the various areas of Psychology. These skills involve being able to (i) select the most appropriate statistical analysis, (ii) perform it, and (iii)judiciously interpret the outcome

TOPICS

Part I: Introduction to statistical inference

1. Sampling distributions
2. Point estimation
3. Statistical hypotheses and interval estimation

Part II: Tests of hypotheses
4. Testing hypotheses about means
5. Testing hypotheses about variances
6. Testing hypotheses about proportions
7. Testing hypotheses about correlation coefficients
8. Introduction to Analysis of Variance (ANOVA)
9. Repeated measures one-way ANOVA
10. Two-way ANOVA
11. Linear regression
12. Introduction to Analysis of Covariance (ANCOVA)
13. Goodness of fit and independence
14. Introduction to non-parametric tests

ASSESSMENT

Grading will be based on three components:
- Final exam (70% of the final mark). The final exam will take place at the end of the semester. It will be based on all material covered during the course and it will consist of exercises and problems similar to those in your assignments, homework, and examples shown in class. The exam will be closed book, but you will be allowed to bring (i) a hand-written formulae sheet (up to 5 DIN-A4 pages, two sided), (ii) a non-programmable scientific calculator, and (iii) a set of statistical tables that will be made available on Virtual Campus. At least 40% of the maximum score in the exam is required to pass this course. Students who fail Statistics II in June will be allowed to take a re-exam in July.
- **Assignments** (20% of the final mark). I will regularly post assignments on Virtual Campus. Postings will be announced in class but students are expected to hand in their assignments through Virtual Campus. Only assignments handed in on time will be graded. Late submissions will receive 0 points (which will contribute to the final mark), but note that all assignments must be submitted to pass the course. No passing mark is required on this component.
- In-class activities (10% of the final mark). Class attendance is highly recommended but not mandatory. Students who attend classes are expected to prepare for them (including homework) and to participate actively. Only those who meet these requirements will earn credit for this component.
Final grades. Provided that you earned at least 40% of the maximum score in the exam, your final mark will be a weighted mean of marks earned on the three components. Final grades will be assigned according to your final mark (ranging from 0 to 10) on the following scale:

[0, 5): Suspenso (SS)
[5, 7): Aprobado (AP)
[7, 9): Notable (NT)
[9,10]: Sobresaliente (SB)

Bear in mind that if you do not obtain at least 40% of the maximum score in the final exam, you will fail the course regardless of your performance on the two other components.

RESOURCES

Textbook

- There is no required text although a list of suggested references is provided below.
- Lecture notes will be made available on Virtual Campus before the corresponding topic is covered in class. It is strongly recommended that you print them and bring them to class.
- Homework exercises and problems will also be regularly posted on Virtual Campus. Further exercises can be found in the books listed below.

Course website

As in Statistics I, the course website, accessible through the virtual campus, is an essential element of the course (http://www.ucm.es//campusvirtual). All course information (including lecture notes, assignments, exercises, supplementary materials, announcements, etc.) will be posted on the virtual campus. You are responsible for checking it regularly for news and updates.

Basic references in English

The following books are all available in the library. Those marked with ** are good sources of extra exercises

Gravetter, F.J. & Wallnau, L.B. (2010). *Statistics for the Behavioral Sciences,* 8th Edition. Belmont, CA: Thomson-Wadsworth.

Spiegel, M.R., Schiller, J., & Srinivasan, R.A. (2008). *Schaum's Outline of Probability and Statistics,* 3rd. Edition. McGraw-Hill. **

Stephens, L.J. (2008). *Schaum's Outline of Statistics in Psychology*. McGraw-Hill.**

Russo, R. (2003). *Statistics for the Behavioural Sciences*. Hove, UK: Psychology Press.

Witte, R.S. & Witte, J.S. (2009). *Statistics*. Hoboken, NJ: John Wiley & Sons.

Basic references in Spanish (available in the library)

Amón, J. (1996). *Estadística para Psicólogos 2. Probabilidad y Estadística Inferencial.* Madrid: Pirámide.

Martínez Arias, R., Chacón Gómez, J. C., Castellanos López, M. A. (2014). *Análisis de Datos en Psicología y Ciencias de la Salud. Vol. II.* Madrid: EOS.

Further references (some of them, but not all, available in the library)

Berry, D.A. & Lindgren, B.W.(1990). *Statistics. Theory and Methods*. Belmont, CA: Brooks/Cole Publishing Company.

Devore, J.L. (1987). *Probability and Statistics for Engineering and the Sciences*. Monterey, CA: Brooks/Cole Publishing Company.

Freund, J. E. (2007). *Modern Elementary Statistics, 12th Edition*. Englewood Cliffs, NJ: Prentice-Hall.

Hays, W. L. (1988). *Statistics*. New York, NY: Holt, Rinehart & Winston.

Howell, D. (2010). *Statistical Methods for Psychology, 7th Edition*. Belmont, CA: Thomson-Wadsworth.

Howell, D. C. (2016). *Fundamental Statistics for the Behavioral Sciences*, 9th Edition. Belmont, CA: Cengage Learning.

Pardo, A. y San Martín, R. (1994). *Análisis de datos en Psicología II.* Madrid: Pirámide.

Peña, D. (1995). *Introducción a la Estadística para las Ciencias Sociales.* Madrid: McGraw-Hill Interamericana.

Siegel, S., & Castellan, N.J. (1988). *Nonparametric Statistics for the Behavioral Sciences.* New York, NY: McGraw-Hill.