

Degree	Type	Year
2503852 Applied Statistics	OT	4

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Teaching groups languages

You can view this information at the [end](#) of this document.

Prerequisites

It is highly recommended to have acquired the competences worked on in the two previous methodological subjects: "Research Methods, Design and Techniques" and "Data Analysis". Therefore, students have to be able to understand and apply the methodology used for research in psychology, as well as basic descriptive and inferential data analysis techniques.

Objectives and Contextualisation

"Statistical and psychometric models" is taught in the second semester of the second year, after having completed the two previous subjects on methodology, through which the students must have acquired the foundations of research methodology and data analysis.

On the basis of these previous subjects, in the current subject students will now move on to more complex statistical models, of a multivariable nature, introducing analytical solutions to three common phenomena in

psychological research: interaction between variables; statistical control of confusing variables; and reduction in the dimensionality of data.

The training objectives of this subject are:

1. To learn the concept of a statistical model as an approach to the multidimensionality of research in psychology.
2. To understand the relationship between the research design used and the corresponding data analysis.
3. To know when and how to apply data-reduction techniques.

At the end of the course, students must be able to:

1. Specify the statistical model appropriate to the objectives and hypotheses of psychological research when research design allows this.
2. Distinguish between models that respond to a predictive hypothesis and those that respond to an explanatory hypothesis.
3. If necessary, include interaction variables and/or adjustment variables in the model.
4. Decide on the need to keep terms of interaction and/or adjustment variables in the model.
5. Correctly estimate and interpret the coefficients of a regression model.
6. Delimit the main aspects to be diagnosed when validating the model.
7. Know how to apply a principal-components analysis to reduce data dimensionality; correctly determine the number of components retained; optimal rotation of the said components; and perform an adequate interpretation of their meaning.
8. Understand the statistical analysis carried out in research papers that use predictive or explanatory statistical models, or data-reduction models.
9. Know the basic statistical vocabulary in Catalan, Spanish and English.
10. Know the basic elements of statistical analysis software.

Learning Outcomes

1. CM14 (Competence) Propose the statistical model needed to analyse data sets belonging to real studies.
2. KM17 (Knowledge) Recognise the statistical models for the analysis of data with different structures and complexities that frequently appear in different fields of application.
3. KM18 (Knowledge) Recognise the language of applications of economics and finances, biomedical science and engineering, provided by research and innovation in the field of statistics.
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5. SM16 (Skill) Select appropriate sources of information for the statistical work.

Content

- U1. Analysis of internal consistency
- U2. Consistency or agreement

U3. Introduction to confirmatory factor analysis
 U4. One-dimensional exploratory factor analysis
 U5. Multidimensional exploratory factor analysis
 U6. Rotation
 U7. Models for continuous quantitative responses
 U8. Categorical predictors
 U9. Predictive models
 U10. Explanatory models
 U11. Model diagnosis and results publication
 U12. Analysis of variance

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Practical classes (small groups): approach and resolution of different practical problems of investigation analysis	26	1.04	
Theoretical classes: master class with multimedia support	19.5	0.78	
Type: Supervised			
Supervision of the resolution of the practices carried out autonomously	7.5	0.3	
Type: Autonomous			
Bibliographic and documentary consultations	7	0.28	
Monitoring and participation in discussion forums through the virtual campus	7.5	0.3	
Practical review of the main analytical procedures of the course through the resolution of the practices	10	0.4	
Reading the "Theory Schemes" for the preparation of theoretical classes	30	1.2	
Self-study: Completion of summaries, diagrams and conceptual maps	37.5	1.5	

This course provides different activities based on active-learning methodologies that are centred on the student. This involves a "hybrid" approach in which we combine traditional teaching resources with other resources aimed at encouraging meaningful and cooperative learning.

N.B. The proposed teaching and assessment methodologies may experience some modifications as a result of the restrictions on face-to-face learning imposed by the health authorities. The teaching staff will use the Moodle classroom or the usual communication channel to specify whether the different directed and assessment activities are to be carried out on site or online, as instructed by the Faculty.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continuous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Evidence 1: Delivery of the results of the analyses made autonomously of a practical problem related to units 1-6. It must be done in pairs (approx. 4-7 weeks)	15	0	0	CM14, KM17, KM18, SM16
Evidence 2: Written evidence consisting of a set of multiple choice questions related to units 1-6, as well as to the Stata syntax that make the previous analysis (1st assessment period)	40	2.5	0.1	
Evidence 3. Delivery of the results of the analyses carried out autonomously of a practical problem related to units 7-12. It must be done in pairs (approx. Weeks 13-17)	15	0	0	CM14, KM17, KM18, SM16
Evidence 4: Written evidence consisting of a set of multiple choice questions related to units 7-12, as well as to the Stata syntax that make the previous analysis (2nd assessment period)	40	2.5	0.1	

EV1 and EV3 are performed in groups of two people. The writing must be totally original and not copied from other sources or groups. In order for an evidence to be evaluated, it will be necessary to have attended 2/3 of its practices in person. Students must report in the first two weeks of class, through an application integrated into the virtual campus, with whom they will form a partner to carry out the work. The weight of each of these evidences is 15%. These evidences will be delivered through the Campus Virtual.

The EV2 and EV4 (individual exams) consist of a set of approximately 25 multiple choice questions (three answer options, penalty for errors; two errors discount one correct, according to the usual criteria $k-1$). Students will be allowed to bring printed the material prepared by the teaching team as well as notes of the student's own elaboration. Electronic devices will not be available except for a calculator (not a mobile phone). At demand of the teaching staff, the students could have the statement and some Stata results tables a few hours before.

At demand of the teaching staff, the grade obtained in each of the evidences may require an individual defense.

The responses to all the evaluation evidence must be original (writings detected from other sources or copied or plagiarized responses will not be accepted). A breach of this condition implies the nullification of the evidence. More than one non-compliance will suppose a final qualification of 0 in the subject (in application to the regulations on evaluation of the UAB and of the Psychology degree. These measures will be applied to all the people involved in the evaluation irregularity.

In order to pass the subject through continuous assessment, the following criteria must be met: 1) The weighted sum of all the evidence must be equal to or greater than 5 points. 2) The average of EV2 and EV4 should be 4.5 or higher (on a scale of 0 to 10); otherwise the maximum grade in the course will be 4.5.

In accordance with the UAB regulations, students who have not passed the course and who meet: 1) have carried out evidence with a weight of at least 2/3 of the total and 2) have a continuous assessment mark 3.5 or higher, may be eligible for resit. The EV2 and/or EV4 can be recovered. The qualification of the recovered evidence will replace the previously obtained and the total qualification will be recalculated with the criteria aforementioned.

A student who has submitted evidence of learning with a weight equal to or greater than 4 points (40%) will be recorded as 'evaluable'.

The presentation of the translation of the of the statements of the in-person assessment tests will be carried out if the requirements established in Article 263 of the academic regulations are met and the request is made in week 4 online (e-form) (more information on the faculty website).

No unique final synthesis test for students who enroll for the second time or more is anticipated.

Link to the guidelines for assessment of the faculty's degrees:

https://www.uab.cat/doc/DOC_PautesAvaluacio_2023

The unic assessment is carried out on the same data and place that for the second assessment period. All the contents of the subject will be evaluated.

The two exams corresponding to the Ev2 and Ev4 will be carried out with typical test questions, and a specific Ev5 of the unic assessment that will consist of an instrumental test with a computer in which it is necessary to perform some statistical analyzes, using materials and data matrix from previous exams. The total duration will be 3 hours.

The final qualification of the subject will be obtained as it has been described for the continuous assessment, considering that Ev2 and Ev4 will have a weight of 40 points each, and Ev5 will have a weight of 30 points.

TABLE OF ACTIVITIES FOR UNIC ASSESSMENT

Name and description	Weight	Duration	Date
Evidence 2: Written test consisting of a set of multiple-choice questions relating to units 1-6.	40	Total duration will be 3 hours	Second assessment period
Evidence 4: Written test consisting of a set of multiple-choice questions relating to units 7-12.	40		
Evidence 5: Instrumental test with computer consisting of performing analyzes with Jamovi.	30		

Bibliography

Reference manuals:

Abad, F.J., Olea, J., Ponsoda, V. & García, C. (2011). *Medición en ciencias sociales y de la salud*. Madrid: Síntesis.

Kleinbaum, D.G., Kupper, L.L., Nizam, A., Muller, K. & Rosenberg, E.S. (2012). *Applied Regression Analysis and other Multivariable Methods*. (5^a ed.). Boston (MA): Cengage Learning, Inc.

Ajenjo, C., Miguel, F.J., Grier, O. (2021). Manual d'ús de Jamovi per anàlisi de dades en estudis socials. Bellaterra: Universitat Autònoma de Barcelona.

Losilla, J.M., Vives, J. (2023). MaAnálisis de Datos con jamovi. Bellaterra: Universitat Autònoma de Barcelona.

Other references:

Domènech, J.M. & Granero, R. (2004). *Anàlisi de dades en Psicologia* (Vols. 1 i 2) (2ª Ed.). Barcelona: Signo.

Martínez Arias, R. (1995). *Psicometría: Teoría de los tests psicológicos y educativos*. Madrid: Síntesis.

Meltzoff, J. (2000). *Crítica a la investigación. Psicología y campos afines*. Madrid: Alianza Editorial.
(Traducción del original de 1998).

Viladrich, M.C. & Doval, E. (Eds.) (2008). *Psicometria*. Barcelona: Edicions UOC.

Software

Jamovi

Language list

Name	Group	Language	Semester	Turn
(PLAB) Practical laboratories	111	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	112	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	113	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	114	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	211	Catalan/Spanish	second semester	morning-mixed
(PLAB) Practical laboratories	212	Catalan/Spanish	second semester	morning-mixed
(PLAB) Practical laboratories	213	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	214	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	311	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	312	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	313	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	314	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	411	Catalan/Spanish	second semester	morning-mixed
(PLAB) Practical laboratories	412	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	413	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	414	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	511	Catalan	second semester	morning-mixed

(PLAB) Practical laboratories	512	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	513	Catalan/Spanish	second semester	morning-mixed
(TE) Theory	1	Catalan	second semester	morning-mixed
(TE) Theory	2	Catalan/Spanish	second semester	morning-mixed
(TE) Theory	3	Catalan/Spanish	second semester	morning-mixed
(TE) Theory	4	Catalan	second semester	morning-mixed
(TE) Theory	5	Catalan	second semester	morning-mixed