

**COURSE DATA****Data Subject**

<b>Code</b>	33311
<b>Name</b>	Psychometrics
<b>Cycle</b>	Grade
<b>ECTS Credits</b>	9.0
<b>Academic year</b>	2022 - 2023

**Study (s)**

<b>Degree</b>	<b>Center</b>	<b>Acad. year</b>	<b>Period</b>
1319 - Degree in Psychology	Faculty of Psychology and Speech Therapy	2	Annual

**Subject-matter**

<b>Degree</b>	<b>Subject-matter</b>	<b>Character</b>
1319 - Degree in Psychology	12 - Psychometrics	Obligatory

**Coordination**

<b>Name</b>	<b>Department</b>
BADENES RIBERA, LAURA	267 - Behavioral Sciences Methodology
HERNANDEZ BAEZA, ANA MARIA	267 - Behavioral Sciences Methodology

**SUMMARY**

- Psychometrics is a compulsory year-long subject taught in the 2nd year of the Degree in Psychology.
- Its 9 credits are distributed into 6 theoretical and practical credits in the first semester and 3 theoretical and practical credits in the second one.
- Students are expected to learn the basics of psychological measurement using scales and tests: its characteristics, basic methods of scale and test construction, the most important theories of testing and evaluation of their measurement quality.
- This subject is both theoretical and practical.



## PREVIOUS KNOWLEDGE

### Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

### Other requirements

Relation to other subjects of the same degree:

Degree in Psychology:

36244 Statistics I: it is required to have passed this subject.

36245 Statistics II: it is required to have passed this subject.

Other requirements

User-level computer skills: be able to handle basic computer tools, to surf the net and to use some office programmes (Word, Excel, Powerpoint).

## OUTCOMES

### 1319 - Degree in Psychology

- Students must have acquired knowledge and understanding in a specific field of study, on the basis of general secondary education and at a level that includes mainly knowledge drawn from advanced textbooks, but also some cutting-edge knowledge in their field of study.
- Students must be able to apply their knowledge to their work or vocation in a professional manner and have acquired the competences required for the preparation and defence of arguments and for problem solving in their field of study.
- Students must have the ability to gather and interpret relevant data (usually in their field of study) to make judgements that take relevant social, scientific or ethical issues into consideration.
- Students must be able to communicate information, ideas, problems and solutions to both expert and lay audiences.
- Students must have developed the learning skills needed to undertake further study with a high degree of autonomy.
- Know how to select and manage tools, products and services, and identify stakeholders.
- Know how to analyse and interpret the results of assessment.
- Value the contributions made by scientific research to knowledge and professional practice.
- Know the principles of the scientific method and the characteristics of the different methods used in psychology and its analytical techniques.



- Be able to apply methodological knowledge to solve the problems arising in professional practice.
- Be able to apply, interpret, critically evaluate and communicate the results of the psychometric evaluation.

## LEARNING OUTCOMES

According to the "Verification Report", at the end of the course, the student will know:

1. Assess the different ways of measuring psychological variables.
2. Carry out measurements using scales, questionnaires, surveys, and tests.
3. Identify the components in the construction of a test.
4. Identify test theories: Classical test theory, Item response theory.
5. Analyze the elements of a test and the technical properties of the test: precision (reliability, information) and usefulness for the intended purpose (validity).
6. Contemplate the deontological aspects of the use of tests.

Therefore, on successful completion of the course students will know:

- What the process of construction of psychometric instruments is and how it is carried out. Elaboration, analysis, validation and scoring.
- What the analysis and evaluation of existing psychometric instruments is and how it is performed. Adaptation of tests.
- What an adequate use of the psychometric instruments is and how it is carried out. Selection, management, analysis, interpretation and report writing.

## DESCRIPTION OF CONTENTS

### 1. Introduction to Psychometrics.

1. The process of psychometric inference
2. Historical context
3. Types of measurement. Levels of measurement. Acceptable statistics. Utility criterion
4. Psychometrics in the context of psychology as a science, in psychological research and in the psychologist's professional practice



## **2. Fundamentals of scaling for test and scale construction.**

1. Definition and characteristics of a psychometric scale
2. General process of scaling and measurement
3. Scaling and measurement procedures.

## **3. Methods of psychological scaling.**

1. Unidimensional scaling methods.
2. Introduction to multidimensional scaling methods.

## **4. Test construction.**

1. Relation between scaling and test construction
2. Definition and characteristics of the psychometric test
3. Test construction
4. Scoring methods
5. Item analysis
6. Quality of the test: reliability and validity.
7. Analysis and evaluation of published tests.

## **5. Classical test theory: basics of the classical linear model.**

1. Spearmans model formalisation
2. Relations and indices deduced from hypotheses of the model
3. Reliability index, reliability coefficient and standard error of measurement

## **6. Estimation of reliability.**

1. Conditions of parallelism
2. Reliability coefficient as observed variance ratio due to true variance
3. Procedures for estimating reliability
4. Alpha coefficient: factors on which it depends, interpretation, variants
5. Reliability of a compound
6. Estimating true scores and contrasting scores
7. Limitations and critical aspects of this procedure: homogeneity, how to increase reliability, minimum values according to the objective pursued



## **7. Validity.**

1. Basic concepts.
2. Historical evolution up to the present.

## **8. Validity: Internal evidence sources.**

1. Adequacy of test content.
2. Internal structure of the test. Test dimensionality. Exploratory Factor Analysis.

## **9. Validity: External sources of evidence**

1. Relations between test and other variables
2. Relations between test and criterion
3. Convergent and discriminant validity
4. Bias and Differential Item Functioning
5. Other sources of evidence.

## **10. Validity: Other aspects.**

1. Factors that affect the validity of the test
2. Coefficient of validity and decision-making
3. Validity in test manuals and in the Official College of Psychologists (COP) recommendations.
- Deontological aspects of the use of tests.

## **11. Interpretation of scores**

1. Interpretation of scores: standards and criteria
2. Samples and scales
3. The process of scoring: analysis and evaluation of the tests and scales
4. Scoring.

## **12. Item response theory: models, estimation and fit**

1. General conditions and assumptions
2. Types of models: features and properties
3. Checking assumptions
4. Estimation of parameters
5. Fit assessment



**13. Item response theory: Applications**

1. Item and test effectiveness: information functions
2. Relative efficiency
3. Test characteristic curve
4. Advantages, limitations and applications

**WORKLOAD**

ACTIVITY	Hours	% To be attended
Theoretical and practical classes	90,00	100
Development of group work	10,00	0
Development of individual work	15,00	0
Study and independent work	30,00	0
Readings supplementary material	5,00	0
Preparation of evaluation activities	20,00	0
Preparing lectures	30,00	0
Preparation of practical classes and problem	20,00	0
Resolution of case studies	5,00	0
<b>TOTAL</b>	<b>225,00</b>	

**TEACHING METHODOLOGY**

According to the “Verification Report”, teaching strategies in this subject include:

M4. Theoretical-practical classes with the support of audiovisual media, links to different websites with content related to the subject, manuals and scientific articles and other readings and materials.

M7. Practical sessions in a computerized classroom, seminars and workshops aimed at applied aspects, in which the student individually or in a group works with the material provided (tests, articles, computers, software and databases) to achieve an aim. An important feature is that there is a debriefing followed by a discussion around the learning objective in question. Here the student takes a very active part in the learning process.

M8. Carrying out exercises on theoretical and applied aspects with self-contained materials.

This implies:

1. Presentations (lectures) on the contents of the course
2. Practical classes based on exercises, case discussion and problem solving



3. Study, problem solving, readings and preparation for lessons and independent work
4. Individual tutorials at the office hours requested by students or lecturers if necessary
5. Scheduled group tutorials if necessary

The use of mobile devices, tablets and laptops will be at the disposal of the teaching methodology proposed by each teacher.

## EVALUATION

The assessment and marking shall be subject to the provisions of the Regulations on Assessment and Marking (*Reglament d'avaluació i qualificació*) of the University of Valencia (ACGUV 108/2017).

**Marking system and criteria (Article 16):** Results of the different assessment activities as well as the final result obtained by students in this course will be marked on a numerical scale from 0 to 10 points to one decimal place:  $0 \leq \text{Fail} < 5$ ;  $5 \leq \text{Pass} < 7$ ;  $7 \leq \text{Good} < 9$ ;  $9 \leq \text{Excellent} \leq 10$ .

**Excellent with distinction (Article 17):** An excellent with distinction can be awarded to a student having obtained a mark of 9.0 or higher by strict order of results in the examination record. The number of students being awarded an excellent with distinction cannot exceed 5% of the students enrolled in the course in the academic year. These conditions shall be applied to every group of the course.

In case of students with the same total mark, the one obtaining Excellent with distinction will be the student with the highest mark in Section 1. In case of students with the same total mark and the same mark in Section 1, the one obtaining Excellent with distinction will be the student with the highest mark in Section 2.

**Assessment procedure and criteria (Article 6):** The mark of the course depends on the assessment of the following sections:

**Section 1. "Examinations"** Assessment of theoretical and practical contents through written examinations. This will be worth **70%** of the final grade (7 points).

**Section 2. "Reports"** Oral and/or written presentation of reports, individual or group projects, clinical cases, problem solving and/or diagnostic test management; may include problem solving and data management with statistical and psychometric software. It will be evaluated based on the quality of the results. This will be worth **20%** of the final grade (2 points).



**Section 3. “Assignments”.** Active participation and performing of classroom activities, seminars and workshops, individually or in group; problem solving and data management with statistical and psychometric software; and motivation for quality of learning outcomes can all be taken into account. It will be evaluated based on the quality of the results. This will be worth **10%** of the final grade (1 points).

Students have the right to two attempts (Art. 5).

**Assessment criteria (Art. 16) and similarities between the first and second calls (Art. 6):**

1. Each section will be worth the same at both calls (section 1, 70%, section 2, 20% and section 3, 10%).
2. Attaining at least 50% in section 1 and 50% of section 2 is necessary to pass the course.
3. Section 1 is divided into two parts: midyear examination 1, based on the contents of the first semester (2/3 of the course, 4.7 points of the final grade) and examination 2, based on the contents of the second semester (1/3 of the course, 2.3 points of the final grade). A separate examination will be conducted for each of them.
4. An examination is deemed passed (Article 16) when a mark of 5 or higher on a scale of 0 to 10 has been obtained. Examinations with a mark lower than 5 result in a final mark of *Fail* in the course, which shall be resat. If an examination has a mark lower than 5, the maximum mark of the course will be 4. In order to implement these marking criteria and allow students to resit their examinations, this two-part structure will be kept for the two calls.
5. For the assessment of sections 2 and 3, lecturers may request individual or group interviews from students during teaching or office hours to verify the degree of participation and achievement of the objectives set for any task developed. Not accepting such verification will lead to failing the task or activity in question.
6. Sections 1 and 2 can be resat at the second call. Section 3 cannot be resat at the second call. At the second call, the notes of the non-resat activities will be kept – section 3 (art. 6.6).

**Differences between the first and the second calls (Art. 6):**

**Section 1. First Call:** A qualifying midyear examination will be sat at the end of the first semester on the official date established by the Faculty of Psychology. The students who pass it will have to sit an examination of the second part on the official date of the first call. Students not passing the first semester examination will have to pass both examinations (first and second part) on the official date of the first call. On this date both examinations can be taken consecutively in separate tests or in a joint test including both parts duly identified.

**Section 1. Second Call:** For the second call, the mark of any of both examinations ( $\geq 5$ ) will be carried forward. Section 1 will be assessed with the same kind of examinations at both the first and second calls.





**Sections 2 and 3. First Call:** Students may be assessed through the following procedures: reports or written assignments; oral presentations of such reports or assignments; case studies and problem solving to show their knowledge and results; preparation, evaluation, application, analysis, and interpretation of psychological test results (tests, questionnaires, scales, etc.) and data management using the appropriate computer and calculation tools.

**Sections 2 and 3. Second Call:** For the second call, the marks of sections 2 and/or 3 ( $\geq 5$ ) will be carried forward if previously passed. Assessment of section 2 at the second call may be carried out either through one of the procedures specified for the first call (with the obvious exception of classroom presentations) or by passing an examination, test or exercise that will be specifically designed to assess the students' knowledge and skills in this section. This examination will be sat on the date of the second examination call and it may require the resolution of cases and/or the analysis and interpretation of problems and results with exercises and activities. Lecturers will inform students of the way the section will be reassessed at the second call according to the character of the activities performed and the conditions available for the examination. These assessment procedures may be combined.

**Absent mark (Art. 6):** At first call if a student has not sat any section 1 test (included the midyear test), their mark will be *Absent* (*No Presentado* or *NP*), regardless of the rest.

At the second call, if a student has not been assessed for any section (1, 2 or 3), the examination record of the course shall include an *Absent* mark.

At both the first and second calls:

If any mark has been recorded in section 1, but minimum requirements have not been met, their mark will be *Fail*. If a mark of 5 has not been attained in one of both examinations, the overall maximum mark of the course will be 4.

If any mark has been recorded in section 1, and minimum requirements have been met, but a minimum overall mark of 5 has not been attained, the overall mark of the course will be *Fail* based on the weighted marks of both sections.

**Development of examinations (Art. 11):** Lecturers may require students to show an official photo ID at the beginning of the test. No valid proof of identity may result in being banned from the examination.

Lecturers will allow access to the examination room during the first 15 minutes from the official start time of the examination, unless one of the students leaves the classroom during this time.

If a student leaves the classroom after the examination has been handed out, they will be asked to print their name in the examination and will be considered as having sat this test at this attempt.

The rules for the development of examinations apply to all assessment tasks in section 1, as well as those in sections 2 or 3 requiring this kind of assessment.



**Dishonest assessment elements (Article 13):** Students are obliged to comply with the rules and procedures ensuring the authenticity and the privacy of the assessment. Any behaviour or act contravening these rules may lead to a stop in the test, its submission and the student's ban from the classroom no sooner has it been detected (Article 13). Students must refrain from using or participating in dishonest means in any assessment tests or assignments (Article 2). In any case, when there is evidence of dishonest practices in a test or in a part of it, it can be marked with a zero (Article 13). Evidence of copying or plagiarism in any of the assessable tasks will result in it being marked with a zero and in appropriate disciplinary action being taken.

In the event of fraudulent practices, the Action Protocol for fraudulent practices at the University of Valencia will be applied (ACGUV 123/2020):

<https://www.uv.es/sgeneral/Protocols/C83sp.pdf>

**Release and review of results (Article 18):** Throughout the course, lecturers will inform students of the results of the tests leading to the final mark. Lecturers will release the proposed overall mark of the course within 14 calendar days at the first attempt and within 10 calendar days at the second attempt. Together with this mark, the place, date and time of the examination review shall be indicated at least 24 hours in advance. All marks of the different tests leading to the overall mark shall be published on the virtual learning environment of the course.

Following the review with a lecturer, students can request to begin an appeal against their marks in accordance with the regulations (Art 21). Reviews and Appeals shall be subject to the provisions of the Regulations on Assessment and Marking (*Reglament d'avaluació i qualificació*) of the University of Valencia (ACGUV 108/2017).

This course guide (Art. 4) is in accordance with the Qualification Verification Report (*Memòria de Verificació del Títol*) and has been approved by the Degree Academic Committee (*Comissió Acadèmica del Títol de Grau* or CAT).

## REFERENCES

### Basic

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- Meliá, J.L. (1990). *Métodos de escalamiento unidimensional*. Valencia: Cristóbal Serrano Villalba.
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- Meliá, J.L. (1994). Introducción a la medición y al análisis de datos. Valencia: Alhori.
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[https://www.youtube.com/watch?v=BRa36cWnPtE&list=PLiPJN11xCP1v93dh\\_swPHLww0VyZO6ENX&ab\\_chan](https://www.youtube.com/watch?v=BRa36cWnPtE&list=PLiPJN11xCP1v93dh_swPHLww0VyZO6ENX&ab_chan)