VNIVERSITAT DE VALÈNCIA

Course Guide
43880 Introduction to research 2

COURSE DATA

Data Subject	
Code	43880
Name	Introduction to research 2
Cycle	Master's degree
ECTS Credits	3.0
Academic year	2022 - 2023

Study (s)

Degree	Center	Acad. year	Period
2175 - Master's Degree in Advanced Optometry and Vision Sciences	Faculty of Physics	1	First term
3144 - PhD in Optometry and Vision Sciences	Doctoral School	0	First term

Subject-matter

Degree	Subject-matter	Character
2175 - Master's Degree in Advanced Optometry and Vision Sciences	16 - Introduction to research 2: biostatistics	Optional

Coordination

Name	Department
ESTEVE TABOADA, JOSE JUAN	280 - Optics and Optometry and Vision Sciences

SUMMARY

This subject is an introduction to Biostatistics (or Statistics for Health Sciences), with a practical orientation, that should allow the professional optometrist an immediate application to their daily practice. Given that this discipline constitutes the basic scientific method of optometric research, a basic knowledge would allow optometrists to gain access to a wider variety of research papers in specialized scientific journals. It would also help the optometrist to analyse the large database they accumulate in daily practice.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

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

Other requirements

The students need only a basic knowledge of general mathematics. Implicitly, all subjects dealing with the study of the structure and function of the visual system need a basic knowledge of biostatistics, since the parameters of study are statistical in nature.

COMPETENCES (RD 1393/2007) // LEARNING OUTCOMES (RD 822/2021)

2175 - Master's Degree in Advanced Optometry and Vision Sciences

- Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.
- Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.
- Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.
- Students should demonstrate self-directed learning skills for continued academic growth.
- Students should possess and understand foundational knowledge that enables original thinking and research in the field.
- Know how to work in multidisciplinary teams reproducing real contexts and contributing and coordinating their own knowledge with that of other branches and participants.
- Participate in, lead and coordinate debates and discussions, be able to summarize them and extract the most relevant conclusions accepted by the majority.
- Use different presentation formats (oral, written, slide presentations, boards, etc.) to communicate knowledge, proposals and positions.
- Proyectar sobre problemas concretos sus conocimientos y saber resumir y extractar los argumentos y las conclusiones más relevantes para su resolución.
- Tener capacidad de análisis crítico de la información especializada en los ámbitos propios del máster.
- Tener un compromiso ético y responsabilidad social, tanto en lo que compete a la componente asistencial ligada a la profesión de óptico-optometrista como a lo que respecta a la investigación clínica.

- Tener capacidad de trabajo en equipos multidisciplinares en el área de las ciencias de la salud.
- Conocer la legislación aplicable en el ejercicio profesional, con especial atención a las materias de de igualdad de género entre hombre y mujeres, derechos humanos, solidaridad, protección del medio ambiente y fomento de la cultura de la paz.

LEARNING OUTCOMES (RD 1393/2007) // NO CONTENT (RD 822/2021)

Students understand that to arrive to reliable and repeatable conclusions, a rigorous method is required not only for the experimental measurements they are familiar with, but for the previous design of the study and the posterior data analysis. Students learn to work with different data analysis software tools, such as SPSS, PSPP and Excel.

DESCRIPTION OF CONTENTS

1. NEED OF STATISTICS IN OPTOMETRY

Need for and importance of Statistics. Brief historical introduction. Definition of descriptive statistics and inferential statistics. Error Theory.

2. STATISTICS: INITIAL CONCEPTS

Different types of data and scales. Population and sample, parameters, statistics and statistical sampling. Descriptive analysis of random variables. Concept of probability and probability distribution. Probability distributions of practical application.

3. DESCRIPTIVE STATISTICS: DATA ANALYSIS AND REPRESENTATION

Descriptive analysis and graphs of qualitative variables. Descriptive analysis and graphs of quantitative variables.

4. INTRODUCCTION TO STATISTICAL INFERENCE I

The sampling distribution. Introduction to statistical inference. Estimation based on confidence intervals.

5. INTRODUCTION TO STATISTICAL INFERENCE II

Introduction to hypothesis testing. Hypothesis testing and interval estimation. Inference with one variable: contrast for a mean. Error types and power. Parametric and non-parametric statistics.

6. NORMALITY CHECKS

Graphical evidence of normality. Normality tests.

7. LINEAR CORRELATION ANALYSIS. LINEAR REGRESSION ANALYSIS

Scatter plots. Covariance and Pearson correlation coefficient. Spearman's correlation coefficient. Relationship and causality. Linear regression analysis. Assumptions of the linear regression model.

WORKLOAD

ACTIVITY	Hours	% To be attended
Computer classroom practice	10,00	100
Theory classes	8,00	100
Seminars	6,00	100
Preparation of evaluation activities	12,00	0
Preparing lectures	28,00	0
Preparation of practical classes and problem	5,00	0
TOTAL	**69,00**	

TEACHING METHODOLOGY

The different concepts will be introduced by means of the analysis of practical cases, using different computing tools (Excel, SPSS, PSPP, ...) in the informatics lab.

In this subject, the use of teaching innovation methodologies is promoted, such as the flipped classroom to enhance the learning of the most important elements of the subject.

EVALUATION

The evaluation will be done through two items:

1) Continuous assessment activities (20% of the grade). The students must carry out and deliver the practical activities proposed, through the virtual classroom and on the indicated dates.

As they are continuous assessment activities, **the grade obtained in these activities during the first semester will be maintained for the second call of the subject.**

2) Theoretical-practical final exam, with the same type of questions as those raised during the course (80%).

In order to pass the subject, the student must obtain 5 points out of 10 (50% of the total) by adding both parts of the evaluation (without a minimum for each part).

REFERENCES

Basic

- Antonio Pardo, Miguel Ángel Ruíz y Rafael San Martín. Análisis de datos en ciencias sociales y de la salud I. Síntesis. 2ª edición (2015). ISBN: 9788497566476
- Antonio Pardo y Rafael San Martín. Análisis de datos en ciencias sociales y de la salud II. Síntesis (2010). ISBN: 9788497567046
- David S. Moore. Estadística aplicada básica. Antoni Bosch. 2ª edición (2010). ISBN: 9788495348043

Additional

- Thomas J. Quirk. Excel 2010 for Educational and Psychological Statistics: A Guide to Solving Practical Problems. Springer New York (2012). ISBN: 9781461420705
- Brani Vidakovic. Statistics for Bioengineering Sciences: With MATLAB and WinBUGS Support. Springer New York, 2011. ISBN: 9781461403937 (disponible en línea a través de trobes.uv.es)