

MÓDULO	MATERIA	CURSO	SEMESTRE	CRÉDITOS	TIPO
	COMPUTATIONAL STATISTICS FOR PHARMACY	3º	1º	6	OPTIONAL
PROFESORES*			DIRECCIÓN COMPLETA DE CONTACTO PARA TUTORÍAS (Dirección postal, teléfono, correo electrónico, etc.)		
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Dr. Paula Rodríguez Bouzas, <i>Associate Professor</i> . Phone.: 958-243878. E-mail: paula@ugr.es			HORARIO DE TUTORÍAS*		
GRADO EN EL QUE SE IMPARTE			OTROS GRADOS A LOS QUE SE PODRÍA OFERTAR		
Degree in Pharmacy					
PRERREQUISITOS Y/O RECOMENDACIONES (si procede)					
Having attended the subject BIOMETRICS of 1st year of Pharmacy Having proper knowledge of Descriptive Statistics and Calculus					
BREVE DESCRIPCIÓN DE CONTENIDOS (SEGÚN MEMORIA DE VERIFICACIÓN DEL GRADO)					
<ol style="list-style-type: none"> 1. Methods of statistical inference 2. Statistical design of an experiment I: Analysis of variance 3. Statistical design of an experiment I: Regression 4. Non-parametric statistics 5. Sampling on finite populations 6. Treatment of qualitative data 					
COMPETENCIAS GENERALES Y ESPECÍFICAS					
<p>A. Generic competences To develop the ability of using scientific reasoning with experimental data extracting meaningful information and interpreting the analysis results rigorously.</p>					

* Consulte posible actualización en Acceso Identificado > Aplicaciones > Ordenación Docente.



B. Specific competences

CE1. To understand the methodology of analysis of experimental data

CE2. To know how to plan an experimental design from the statistical point of view, solve the analysis with a statistical software and interpret the results properly

CE3. To know the usual techniques of statistical sampling

CE4. To know how to deal with statistical qualitative variables

OBJETIVOS (EXPRESADOS COMO RESULTADOS ESPERABLES DE LA ENSEÑANZA)

As a consequence of the learning process, the student should know how to

a) plan, solve and interpret a statistical hypothesis test and a variance analysis

b) formulate, estimate and interpret a lineal and nonlinear regression model

c) choose the adequate sampling method and calculate its respective sample size

d) work with contingency tables for categorical data

TEMARIO DETALLADO DE LA ASIGNATURA

THEORY CONTENTS:

Unit 1: **Random variables**

Distribution function. Discrete and continuous probability distributions. Expected value and variance.

Distributions in sampling: t-Student, Pearson χ^2 and Fisher-Snedecor distribution.

Unit 2: **Statistical inference by estimation**

Concept and properties of an estimator. Estimation methods: maximum likelihood, mean squares, Bayes, etc.

Estimation with Gaussian variables: Fisher's theorem. Estimation by confidence intervals. Calculation of the sample size.

Unit 3: **Statistical inference by hypothesis tests**

Basis concepts in statistical tests. Test with the Gaussian distribution. Test with two Gaussian variables.

Interpretation of the p-value.

Unit 4: **Statistical design of an experiment I: Analysis of variance**

Linear decomposition of the variance. One factor designs: the ANOVA I model. Two factor designs: the ANOVA II model. Balanced designs with multiple observations: Interaction analysis. Designs by means of latin squares and greco-latin squares.

Unit 5: **Statistical design of an experiment I: Regression**

Introduction. Linear simple regression model. Linear multiple regression model. Non-linear regression. Logistic and Poisson regressions.

Unit 6: **Non-parametric statistics**

Introduction. Tests for paired variables: signs test and Rank-signs Wilcoxon test. Tests for independent variables: Mann-Withney, Kolmogorov-Smirnov and Kruskal-Wallis tests. Friedman test. Spearman's Rank correlation. Dixon and Grubbs tests for anomalous data.

Unit 7: **Treatment of qualitative data**

Goodness of fit asymptotic test. Test of Independence for qualitative variables. Diagnostic agreement.

Analysis of 2x2 contingency tables. Epidemiological applications. Area under ROC curve.



Unit 8: **Sampling on finite populations**

Probabilistic versus intentional sampling. Simple random sampling. Stratified random sampling. Sampling by means of conglomerates. Systematic sampling.

PRACTICE CONTENTS:

Practices will be developed in the Room of Informatics and will consist in studying the solution of case studies by means of a statistical program.

BIBLIOGRAFÍA

BIBLIOGRAFÍA FUNDAMENTAL:

A. Martín-Andrés y J.D. Luna del Castillo: Bioestadística para Ciencias de la Salud. Norma, Madrid (2005).
M.L. Samuels, J.A. Witmer y A. Schaffner: Fundamentos de Estadística para las Ciencias de la Vida. Pearson, Madrid (2012).

BIBLIOGRAFÍA COMPLEMENTARIA:

- E. Cobo, P. Muñoz y J.A. González: Bioestadística para no Estadísticos. Elsevier, Barcelona (2007).
- C.M. Cuadras: Problemas de Probabilidades y Estadística (2 vols.). EUB, Barcelona (1999).
- J.S. Milton: Estadística para Biología y Ciencias de la Salud. McGraw-Hill, Madrid (2001).
- C. Pérez: Estadística Práctica con Statgraphics®. Prencite Hall, Madrid (2002).
- V. Quesada, A. Isidoro y L.A. López: Curso y Ejercicios de Estadística. Alhambra, Madrid (2000).
- F. Rius y F.J. Barón: Bioestadística. Thomson-Paraninfo, Madrid (2008).
- S.M. Ross: Introducción a la Estadística. Reverté, Barcelona (2007).

ENLACES RECOMENDADOS

Web site of Departamental Unit of Statistics in Campus Cartuja: <http://www.ugr.es/~udocente>
SWAD space: <http://swad.ugr.es>

METODOLOGÍA DOCENTE

- Theoretic explanations assisted by blackboard, computer and projector
- Practical sessions with computer dealing with real and simulated data
- Discussion sessions on specific topics of the program

EVALUACIÓN (INSTRUMENTOS DE EVALUACIÓN, CRITERIOS DE EVALUACIÓN Y PORCENTAJE SOBRE LA CALIFICACIÓN FINAL, ETC.)

- Theoretic exam: 4 points
- Practice exam with computer: 3 points
- Solving practical works proposed by the teacher: 3 points
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INFORMACIÓN ADICIONAL

