# 25912 - Research methodology II

**Información del Plan Docente**

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|---|---|
| **Academic Year** | 2016/17 |
| **Academic center** | 301 - Facultad de Ciencias Sociales y Humanas |
| **Degree** | 270 - Degree in Psychology |
| **ECTS** | 6.0 |
| **Course** | 2 |
| **Period** | First Four-month period |
| **Subject Type** | Compulsory |
| **Module** | --- |

## 1.Basic info

## 1.1.Recommendations to take this course

## 1.2.Activities and key dates for the course

## 2.Initiation

## 2.1.Learning outcomes that define the subject

## 2.2.Introduction

## 3.Context and competences

## 3.1.Goals

## 3.2.Context and meaning of the subject in the degree

## 3.3.Competences

## 3.4.Importance of learning outcomes

## 4.Evaluation

## 5.Activities and resources

## 5.1.General methodological presentation

## 5.2.Learning activities

## 5.3.Program

**LESSON 1. Introduction**
1. What is statistical analysis?

1. Descriptive statistics
2. Inferential statistics

2. Levels of inquiry

1. Descriptive
2. Relational
3. Explanatory

3. Measurement scales

1. Nominal
2. Ordinal
3. Interval
4. Ratio

4. Discrete and continuous variables
5. Quantitative, qualitative and semiquantitative variables

## LESSON 2. Sampling
1. Basic concepts

1. Population and parameter
2. Sample and statistic

2. Types of sampling

1. Random sampling with replacement (Simple random sampling)
2. Random sampling without replacement

3. Other types of random sampling

1. Systematic
2. Stratified
3. Clusters

## LESSON 3. Sampling distributions
1. Basic concepts

1. Deterministic and random experiment
2. Random variable
3. Probability function and distribution function

2. Sampling distribution

1. Definition
2. Example of sampling distribution
3. Characterization of a sampling distribution

1. Shape
2. Mean
3. Standard deviation (Standard error)

3. Sampling distribution of the mean (Normal curve and Student's t distribution)

1. Central limit theorem
2. Normal curve

1. Normal curve properties
2. Standardization of a variable

3. Student t distribution

1. Conditions that bring about a Student's t distribution
2. Properties

4. Sampling distribution of the variance (Pearson's X2 distribution)

1. Conditions that bring about a Pearson's X2 distribution
2. Properties

5. Sampling distribution of the proportion (Binomial distribution)

1. Conditions that bring about a Binomial distribution
2. Properties

6. Sampling distribution of two variances (Snedecor's F distribution)

1. Conditions that bring about a Snedecor's F distribution
2. Properties

**LESSON 4. Estimación de parámetros**
1. Point estimation

1. Definition
2. Properties of a good estimator

1. Lack of bias
2. Consistency
3. Efficiency
4. Sufficiency


3. Confidence interval estimation


1. Definition
2. Definition of confidence level (1-&alpha;) and risk level (&alpha;)
3. Relation between amplitude and confidence level
4. Relation between amplitude and accuracy (Maximum error)
5. Confidence interval estimation for the mean


1. With a large sample
2. With a small sample


6. Confidence interval estimation for the variance


1. Using X2
2. Using normal approximation


7. Confidence interval estimation for the proportion


1. With a large sample
2. With a small sample


4. Accuracy and simple size


1. For the mean


1. With a large sample
2. With a small sample


2. For the variance
3. For the proportion



## LESSON 5. Contrasts hypothesis
1. Definition
2. Differences between scientific hypothesis and statistical hypothesis
3. Statistical hypotheses


1. Null hypothesis
2. Alternative hypothesis

4. Unilateral and bilateral hypothesis
5. Assumptions
6. Contrast statistics
7. Decision rule


1. Rejection region (critical region)
2. Acceptance region


8. Decision


1. Meaning of rejecting a null hypothesis
2. Meaning of rejecting an alternative hypothesis


9. Type error I, type error II, &alpha; and &beta;
10. Three factors that &beta; depends on


1. Distance that separates null hypothesis distribution from alternative hypothesis distribution
2. Value of &alpha;
3. Size of standard error of sampling distribution


11. Critical level


1. For unilateral contrast
2. For bilateral contrast


12. Relation between interval estimation and contrast hypothesis



**LESSON 6. Contrasts hypotheses for the mean**
1. Contrasts hypotheses for one mean


1. When we know population variance (Normal distribution)
2. When we do not know population variance and the simple is small (Student's t distribution)


2. Contrasts hypotheses for two independent means


1. Assuming equal variances
2. Assuming different variances


3. Contrasts hypotheses for two related means
4. Effect size for contrast of the mean



**LESSON 7. One-way analysis of variance**

1. General linear model
2. Introduction to analysis of variance


1. Models of ANOVA
2. The logic behind the ANOVA


3. One-way ANOVA, fixed effects, completely random


1. Data structure and notation
2. The model
3. Assumptions
4. Contrast statistic
5. Model summary


4. One-way ANOVA, fixed effects, repeated measures


1. Data structure and notation
2. The model
3. Assumptions
4. Contrast statistic
5. Model summary


5. Fixed effects and random effects
6. Effect size measures


## 5.4. Planning and scheduling

## 5.5. Bibliography and recomended resources