Advanced statistical methods

Academic Year: (2020 / 2021) **Review date: 07-07-2020**

Department assigned to the subject: Statistics Department

Coordinating teacher: MOLINA PERALTA, ISABEL

Type: Electives ECTS Credits : 6.0

Year : Semester :

Branch of knowledge: Social Sciences and Law

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Estadística para las Ciencias Sociales I: Introducción a la Estadística
Estadística para las Ciencias Sociales II: Técnicas multivariantes

OBJECTIVES

BASIC AND GENERAL COMPETENCES
BASIC COMPETENCES
CB1 Be able to show that they possess and comprehend facts and contents in an area of study which, based on a previous general secondary school level, have been extended to those included in advanced textbooks and in some aspects proceed from the most advanced studies in this area.
CB2 ¿Be able to show that they have learned how to apply their knowledge professionally to their future jobs or tasks and that they possess the competences needed to develop and defend arguments and solve problems in that area of study.
CB3 ¿ Be able to show that they are capable of collecting and interpreting the relevant data (normally within their area of study) needed for formulating judgments which require critical thought on social, scientific and ethical topics of relevance.
CB4 ¿ Be able to show that they are able to transmit information, ideas, problems and solutions both to specialized and non-specialized publics.
CB5 ¿ Be able to show that they have developed the learning skills required to perform further studies with a high degree of self-dependence.

GENERAL COMPETENCES
CG1 ¿ Understand social, political, legal and economic realities from a comparative perspective.
CG3 ¿ Know quantitative and qualitative research techniques and possess the ability to choose which is most adequate to apply in the field of Social Sciences.
CG4 ¿ Be able to manage information: identify, organize and analyze relevant information critically and systematically within the context of international relations.
CG5 ¿ Be able to debate and formulate critical reasoning, using precise terminology and specialized resources, when analyzing international and global phenomena, employing both the concepts and knowledge from different disciplines as well as the methods of analysis, paradigms and concepts pertaining to the Social Sciences.
CG6 ¿ Be able to apply scientific method to the economic, social and political questions of a global society; be able to formulate problems in this context, identify a possible explication or solution, and a method to contrast them by sensibly interpreting the data.

OVERLAPPING COMPETENCES
CT1 ¿ Acquire the capacity to communicate knowledge in oral and written form, both to specialized and to non-specialized publics.
CT2 ¿ Acquire the capacity to establish good interpersonal communication and to work both in interdisciplinary and international teams.
CT3 ¿ Acquire the capacity to organize and plan workloads, taking correct decisions based on the available information, collecting and interpreting relevant data in order to provide assessments in that area of study.
CT4 ¿ Develop the motivation and capacity to perform independent continuous learning for life, with an endowment to adapt to change and new situations.

SPECIFIC COMPETENCES
CE8 ¿ Understand the structure of markets and the impact of public intervention on markets.
CE9 ¿ Be familiar with and comprehend the relevance of technological change for economic and social

development.
CE10 ¿ Be able to discern the differentiating elements in international problems in accordance to the development stages of a country.
CE13 ¿ Be familiar with the principles of cost-benefit analysis and its application to basic problems.

LEARNING RESULTS
· Applied knowledge to construct models which analyze the causal relations between variables.
· Applied knowledge to construct models which contrast hypothesis and predict.
· Applied knowledge to evaluate and criticize different approaches to analyzing a research problem.
· Applied knowledge to reply quantitatively, using empirical research, to questions about how independent variables influence levels and variations of dependent variables.
· Knowledge to reproduce and critically evaluate existing empirical studies in the context of Social Sciences.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction

2. Survey sampling
   2.1. Survey techniques
   2.2. Estimation of socio-economic indicators based on survey data

3. Panel data analysis: models with fixed effects
   3.1. Model fitting and prediction
   3.2. Analysis of socio-economic indicators based on panel data

4. Panel data analysis: models with random effects
   4.1. Model fitting and prediction
   4.2. Estimation of socio-economic indicators based on panel data

5. Heterocedasticity and serial correlation in panel data.
   5.1. Models with heteroscedasticity
   5.2. Models with serial correlation

6. Evaluation of the effects of public interventions
   6.1. Modeling the effects of public interventions
   6.2. Causality

LEARNING ACTIVITIES AND METHODOLOGY

Competences will be acquired by students through theoretical lectures, realization of a project, laboratories and resolution of problems.

ASSESSMENT SYSTEM

Continuous evaluation and/or final exam. Theory. Handouts, class work, tests and/or final exam 60% of final grades. Project in small groups 40% of final grades.

% end-of-term-examination:	60
% of continuous assessment (assigments, laboratory, practicals…):	40

BASIC BIBLIOGRAPHY

- Arellano, M. Panel Data Econometrics, OUP Oxford, 2003
- Baltagi, B.H. Econometric Analysis of Panel Data, John Wiley & Sons Inc, 2013
- Biorn, E. Econometrics of Panel Data: Methods and Applications, OUP Oxford, 2016
- Cochran, W. Sampling Techniques, 3rd Edition, John Wiley., 1977
- Lohr, S. Sampling: Design and Analysis, Duxbury, 1999
- Scheaffer, R.L., Mendenhall, W., Ott, L. and Gerow, K.G. Elementary Survey Sampling, Cengage Learning, Inc, 2010
- Tillé, Y. Sampling Algorithms, Springer, 2002
- Wooldridge, J.M Econometric Analysis of Cross Section and Panel Data, The MIT Press, 2010