

Code: 25837
Degree: BAD
Course: 2º
Specialty Field:
Quarter: 2nd
Credits: 6



School of Business Administration and Economics
Facultad de Ciencias Económicas y Empresariales
Ekonomi Eta Enpresa Zientzien Fakultatea

Program for the course
Statistics Applied to Business Administration

Academic Year
2011/2012

Course
2nd

Undergraduate Degree in Business Administration

Course Type
Core Subject

Department
Applied Economics III (Econometrics and Statistics)

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Professor for this course during the academic year 2011/12:

Vicente A. Núñez Antón

Main objectives for this course:

The main objective for this course is that students become familiar and are able to use all elements related to basic statistical inference: pointwise and interval estimation, properties of estimators, test of hypotheses and goodness-of-fit tests. In order to do so, they have to previously become familiar with the probability distributions required to better understand these statistical concepts. In addition, students will study the most commonly used sampling methods, so that they are able to select and identify the most appropriate method for each case under study. The contents included in this course will allow the student to deal with statistical inferential problems, which are very important in any real data analysis situation, as well as in any study that includes a quantitative component.

Detailed Program:

1. *Using Statistics in Business Administration Decisions [2H-L, 1H-S].*

Introduction. Practical cases. Databases.

2. *Poisson and Binomial Distributions [5H-L, 2H-CE].*

Bernoulli distribution (BE 2.2; MR 7.3). Binomial distribution and binomial frequency (BE 2.2; MR 7.4). Definition and properties of the Poisson distribution (BE 2.2; MR 7.5). Practical issues (BE 2.2; MR 7.5). Tables for the binomial and Poisson distributions (BE 2.2). Convergence of the binomial to the Poisson and normal distributions (BE 2.2, 7.3, 7.4, 7.5; MR 11.7, 11.7.4). Convergence of the Poisson to the Normal distribution (BE 7.4, 7.5; MR 11.7.4).

3. *Gamma, Chi-Square (χ^2), F and t distributions [4H-L, 1H-CE, 1H-S].*

Gamma distribution (BE 2.3; MR 9.5). Exponential distribution (BE 2.3; MR 9.5). Normal square distribution (BE 2.3; MR 9.3.2). Pearson's χ^2 distribution (BE 2.3, 8.3; MR 9.3.2). Snedecor's F distribution (BE 8.3, 8.4; MR 9.3.4). Student's t distribution. (BE 8.3, 8.4; MR 9.3.3).

4. *Parameter Estimation. Properties of estimators [8H-L, 2H-CE, 1H-S].*

Introduction (BE 8.1, 8.2, 8.3, 9.1; RM 1.1, 1.2). Random sample and statistic (BE 8.1, 8.2, 8.3, 9.1; RM 1.3). Parameter estimation (BE 9.1; RM 3.1). Pointwise estimation (BE 9.1, 9.2; RM 3.2). Maximum likelihood estimation (BE 9.2; RM 4.1). Method of moments estimation (BE 9.2; RM 4.3). Unbiased estimators (BE 9.3, 9.4; RM 3.3). Regular estimators (BE 9.3, 9.4; RM 3.4). Cramer-Rao lower bound (BE 9.3, 9.4; RM 3.4). Efficiency (BE 9.3, 9.4; RM 3.4). Convergence in probability and in quadratic mean (BE 7.2, 7.6, 7.7; MR 11.3). Consistency (BE 9.3, 9.4; RM 3.5).

5. Hypothesis Testing. Goodness of Fit Tests [16H-L, 3H-CE, 4H-S].

Fundamentals of hypothesis testing (BE 12.1; RM 6.1, 6.3). Statistical design of hypothesis tests (BE 12.1; RM 6.2). Likelihood ratio test (BE 12.6; RM 6.2). Neyman-Pearson Theorem (BE 12.6; RM 6.2). χ^2 goodness of fit test to a completely or partially specified distribution (BE 13.7, 13.8; RM 1.1, 1.2, 9.2). Tests of independence and homogeneity (BE 13.6; RM 9.6). Interval estimation and hypothesis testing. For the mean. For the difference of means. For the variance. For the ratio of variances. For the parameter λ in a Poisson distribution. For the proportion parameter in a binomial distribution. For the difference of proportions (BE Chapters 11 and 12; RM Chapters 5, 7 and 8).

6. Sampling in Finite populations [7H-L, 1H-CE, 2H-S].

Introduction (LL Chapters 1 and 2; P Chapter 2). Simple random sampling (LL Chapter 3; P Chapter 3). Stratified random sampling (LL Chapters 5 and 6; P Chapter 4). Cluster sampling (LL Chapters 8 and 9; P Chapter 7). Two-stage cluster sampling (LL Chapter 10; P Chapter 8). Items selection process (LL Chapters 3, 5-6 and 8-10; P Chapters 1-4 and 7-8). Sampling in practice.

Specific Objectives for the Course:

- Be able to identify and discriminate the main characteristics for the different theoretical probability models and types of convergence of sequences of random variables. In this way, students can adequately assess their usefulness and applicability in their professional field.
- Be able to identify the different estimation methods, as well as their properties, so that s/he can select the most appropriate alternative of analysis to the specific situation under study.
- Be able to apply the most appropriate statistical methodology for the design of tests of hypothesis that would allow him/her to take on specific decisions in his/her professional field.
- Be able to obtain and interpret the results of specific statistical analysis applied to data in Economics by making use of the most appropriate sources of information, as well as of the required statistical or text editing software tools.
- Become familiar with the different and most commonly used sampling techniques, and be able to identify the most adequate technique for each specific situation under study.

Results of the Learning Process:

1. Comprehension of the main concepts related to the different theoretical probability models.
2. Comprehension and full knowledge of the different parameter estimation methods that guarantees the selection of the best alternative of analysis.
3. Tests of hypotheses to be able to take decision related to the students' professional field.
4. Report of the main results obtained from a statistical analysis of data in Economics that has made use of the most appropriate sources of information, as well as of the required statistical or text editing software tools.

Teaching Methodology:

The teaching methodology to be used in this course will be based on lecture type classes (L), in which students' participation will be actively motivated by using take-home questions and/or exercises that should be analyzed by students prior to the next class and outside of the regular class time period. In addition, there will be a frequent use of classroom exercise type classes (CE) and of seminar type classes (S), in which students will be able to better understand and adequately assess the applicability

the concepts covered in class will have, and, thus, select the most appropriate methods for each specific application.

Grading Process:

The final grade for this course will be based on exercises students will have to do during the whole class period, as well as on passing a written final exam that will include a multiple choice questionnaire, as well as some theoretical and/or practical exercises related to the material included in the program for the course.

Exercises and problems included both in the classroom exercise type and seminar type classes, as well as the regular exercises assigned to students, are all part of the students' ongoing evaluation process.

There will be a final written exam that will include a series of short multiple choice questions and/or questions or exercises of theoretical/practical nature related to the material included in the program for the course.

Grading Process	Weight
Class Attendance:	0%
Class and or Moodle/Ekasi Participation:	0%
Regular Exercises:	0%
Individual Projects:	0%
Group projects:	15%
Partial Exams:	15%
Final Exam:	70%

In order to pass the course it is required that a student obtains a grade of at least 4 (out of 10) in the final exam.

MANAGEMENT REGULATION FOR UNDERGRADUATE STUDIES AND STUDIES OF FIRST AND SECOND CYCLES FOR THE ACADEMIC YEAR 2010/2011. CHAPTER V. TEACHING PLANNING AND STUDENTS'S EVALUATION, Article 43.3.b) *Students that, for justified reasons (i.e., working reasons, people they have to take care of, students having some type of disability of at least 33%, elite sport students, artistic/cultural activities implying regular trips or great dedication to them, reconciliation with other additional higher studies, reconciliation with political, syndical, associational, or NGO responsibilities, or others) that cannot participate in the course's ongoing evaluation process will be able to credit the fulfilling of the knowledge and abilities conditions required to pass this course in a sole final written exam, which should be designed such that it corresponds to the total 100% of the grade for this course....*

Students wishing to make use of the aforementioned exception should apply for it during the first fifteen days of the corresponding quarter by providing the required documentation to his/her course main lecture's professor. The course coordinator will decide on these applications or, in case of

specific doubts about their applicability, he/she will send the application to the corresponding departmental commission named to that effect.

The grading process for the course's second call for each academic year will be, in any case, a final exam based on the total 100% of the grade for this course. This exam will evaluate all the specific objectives and contents developed for this course during the in-class period of classes.

Main Bibliographic References:

Bain, L. and Engelhardt, M. (1992). Introduction to Probability and Mathematical Statistics, Second edition. Duxbury Press, Boston.

Levy, P.S. and Lemeshow, S. (1991). Sampling of Populations. Methods and Applications. Wiley, New York.

Lohr, S.L. (2000). Muestreo: Diseño y Análisis, Internacional Thomson Editores, Mexico.

Martín Pliego, F.J. and Ruíz Maya, L. (2004). Estadística I: Probabilidad, 2ª Edición. AC, Madrid.

Peña, D. (2001). Fundamentos de Estadística, Alianza Editorial, Madrid.

Pérez, C. (2005). Muestreo Estadístico. Conceptos y problemas resueltos, Pearson Educación, Madrid.

Ross, S. (2001). Probability and Statistics for Engineers and Scientists. Academic Press, London.

Ruíz Maya, L. and Martín Pliego, F.J. (2005). Fundamentos de Inferencia Estadística, 3ª Edición, AC, Madrid.

Complementary References for Exercises:

Arteche et al. (2000). Ejercicios de Estadística II: Estadística Empresarial y para Economistas, Servicio Editorial de la Universidad del País Vasco-Euskal Herriko Unibertsitatea, Bilbao.

Fernández, K.; Orbe, J. eta Zubia, M. (1996). Estatistika I eta Estatistika II ariketak. Probabilitate Teoria eta Inferentzia Estatistikoa, UEU, Bilbo.

Garín, A. and Tusell, F. (1990). Ejercicios de Probabilidad e Inferencia Estadística, Tébar-Flores, Madrid.

Martín Pliego, F.J., Montero, J.M^a and Ruíz Maya, L. (2005). Problemas de Inferencia Estadística, 3ª Edición, AC, Madrid.

Martín Pliego, F.J., Montero, J.M^a and Ruíz Maya, L. (2006). Problemas de Probabilidad, 2ª Edición, AC, Madrid.

Chapter	Lectures (L)	Classroom Exercises (CE)	Seminars (S)
1	2	0	1
2	4	1	0
3	5	2	1
4	8	2	1
5	16	3	4
6	7	1	2
Total	42	9	9