



Statistics

1. Basic description

Name of the course: Statistics

Academic year: 2010-2011

Year: 1st

Term: 3rd

Degree / Course: Bachelor's Degree in International Business and Marketing

Code: 41303

Number of credits: 6

Total number of hours committed: 150

Teaching language: English

Lecturer: Mercè Roca

Timetable:

Group 1:

Mondays: 08:00 to 09:30

Tuesdays: 11:15 to 12:45

Friday Seminars: 1A 08:00 to 08:55 / 1B 09:00 to 09:55 / 1C 10:00 to 10:55

Group 2:

Mondays: 11:15 to 12:45

Tuesdays: 08:00 to 09:30

Friday Seminars: 2A 11:30 to 12:25 / 2B 12:30 to 13:25 / 2C 13:30 to 14:25

2. Presentation of the course

This course is about the basic statistical inferential techniques that are used in the managerial environment. It provides a strong background on the main concepts of statistical reasoning whilst emphasizing on problem solving. At the end of the course, students should be able to think about data and use statistical methods with understanding.

This course is mostly methodological and is tightly linked to the course on Data Analysis taken in the second term of the first year of the GNMI studies. While the first course is mostly about descriptive methods, the course on *Statistics* focuses on techniques used to infer characteristics of a particular population based on data collected at a sample level.

The course focuses on developing comprehension of the inferential techniques and pursuing the skills for their application to real life problems. Additionally, it presents computerised ways of solving statistical problems, mostly with the SPSS and Excel packages.

Students will regularly have to practice the application of the studied techniques to particular problems. This will be essential for them to achieve the goals of the course. It is recommended that students review the basic concepts that the Data Analysis course covered and solve any remaining doubts at the very beginning of the *Statistics* course.

3. Competences to be achieved in the course

General competences	Specific competences
<p>Instrumental competences</p> <p>G.I.1. Ability to research, analyse, assess and summarise information.</p> <p>G.I.4. Ability to tackle and resolve problems.</p> <p>Competences for applicability</p> <p>G.A.2. Ability to use quantitative criteria and qualitative aspects when taking decisions.</p>	<p>Disciplinary competences</p> <p>E.D.12. Illustrate the primary sources of economic and business statistics information available nationally and internationally.</p> <p>Professional competences</p> <p>E.P.2. Ability to analyse economic and market indicators when taking decisions within the organisation.</p> <p>E.P.21. Ability to research and use various information resources.</p> <p>E.P.23. Ability to apply and expand upon abstract reasoning.</p> <p>E.P.24. Develop the ability to summarise.</p>

The above competences interrelate with the basic competences set out in Royal Decree 1393/2007, namely:

- a. competence to **comprehend knowledge, on the basis of general secondary education**
- b. competence to **apply knowledge** to day-to-day work in international management or marketing, in particular, ability to develop and defend arguments and to solve problems
- c. competence to **gather and interpret relevant data**, enabling the development of critical judgements on the economic and social reality
- d. competence to **communicate and transmit information** (ideas, problems, solutions) to a specialised and non-specialised public
- e. competence to **develop learning activities** in a relatively autonomous manner.

In order to establish a correspondence between the basic competences and those developed in the degree, these are grouped according to two criteria. Thus, the competences developed in the subject are structured into those that are seen as a development or specification of basic competences and those that define the professional profile of the graduate, with respect to general and specific competences.

Basic competence: **understanding of knowledge**

General competences. G.A.2

Basic competence: **application of knowledge**

Specific competences. E.P.23

Basic competence: **gather and interpret data**

General competences G.I.1

Specific competences E.D.12, E.P.2, E.P.24

Basic competence: **develop learning activities**

General competences G.I.4

Specific competences E.P.21

Competences that define the professional profile which are not included under basic competences

In general, these competences combine the following key elements for professionalising students in the area of international business and marketing:

- provide students with the capacity to adapt to dynamic teams and environments
- provide students with the capacity to create their own integral vision of the operation of a business or international marketing project
- provide students with the capacity to take complex decisions and carry out negotiation processes

General competences . G.I.4

Own competences of the subject

Infer properties about the population based on information provided from a subset or sample.

4. Contents

The course introduces basic inferential statistical techniques. These include point and interval estimation, hypothesis testing, the analysis of variance and the analysis of contingency tables, as well as the implementation of the simple regression model. Throughout the study of these techniques aspects relevant to sampling will also be discussed.

TOPIC 1. Sampling distributions and statistical inference

TOPIC 2. Point and Interval estimation

TOPIC 3. Hypotheses or significance testing: 1 sample tests

TOPIC 4. Hypotheses or significance testing: 2 samples tests

TOPIC 5. Chi-squared tests: goodness of fit

TOPIC 6. One-factor ANOVA

TOPIC 7. Correlation and Regression

5. Assessment

Assessment elements

The following are the different elements that will compose the final grade of the course. Unless there is a certified justification for not completing a particular activity, the grade corresponding to an activity that has not been handed in will be 0. There will be strict deadlines for every hand-in and no delayed delivery will be permitted. If a student has an accepted justification for not completing a particular activity, the corresponding weight will be transferred to the average of the corresponding assessment element.

Assessment elements	Time period	Type of assessment		Assessment agent			Type of activity	Grouping		Weight (%)
		Comp	Opt	Lecturer	Self-assess	Co-assess		Indiv	Group (#)	
Attendance and participation	Class	x		x			Mixed	x	x	10%
Quizzes: Reading tests	1 reading test per topic	x		x			Synthesis-based	x		15%
Exam prep quizzes	Before the exams	x		x			Synthesis-based and problem solving	x		
Exercise lists	Seminars	x	x (extra exercises will be voluntary)	x	x (solutions given for reviewing)	x (solutions will be discussed in the seminar session)	Problem solving	x		15%
Partial exam	Mid-term	x		x				X		20%
Final exam	End of term	X		x				X		40%

- A maximum of 1 extra-point in the final grade will be given to students that have a significant participation in completing the online glossary during the course.
- Attendance is compulsory. If a student does not attend a minimum of 80% of the classes the corresponding grade will be 0. Participation includes involvement in classes and taking part in the proposed activities.
- Reading tests will cover both the contents of the proposed reading and concepts studied in class.
- Exam Prep Quizzes are designed to complement the study time for the exams (mid-term and final). They will cover some of the contents that will be evaluated in the exams.
- The student must have a **minimum weighted average grade of 4 of the continuous assessment elements** (reading tests, exam prep quizzes and exercise lists with a weight of 25%, 25%, and 50% respectively) in order to qualify to pass the course.
- The student must have a **minimum grade of 4 in the final exam** in order to qualify to pass the course.
- If a student does not meet the requirements to qualify to pass the course the course grade will be the minimal between 4 and that resulting from the different assessment elements.
- If a student does not show-up for the exam his/her course mark will be "no presentat".

September evaluation

- The grade in September will keep the contribution of the continuous evaluation elements (grades and percentages) with the only exception of the mid-term exam with the corresponding weight transferred to the final exam. Therefore, the September exam will have a weight of 60%.
- A **minimal grade of 4 in the September exam** is required in order to qualify to pass the course.

- If a student does not meet the requirements to qualify to pass the course, his/her final grade will be the minimal between 4 and that resulting from the different assessment elements.
- If a student does not show-up for the September exam his/her course mark will be “no presentat”.

Assessment of competences:

The different evaluation elements will allow assessing the level of achievement of the list of competences the course has been assigned in the study plan. The following table describes which competences are covered by each evaluation element:

	Participation	Reading tests	Prep Quizzes	Exercise lists	Partial exam	Final exam
GENERAL COMPETENCES						
Instrumental competences						
G.I.1. Ability to research, analyse, assess and summarise information	X	x				
G.I.4. Ability to tackle and resolve problems	X		x	x	x	x
Competences for applicability						
G.A.2. Ability to use quantitative criteria and qualitative aspects when taking decisions			x	x	x	x
SPECIFIC COMPETENCES						
Disciplinary competences						
E.D.12. Illustrate the primary sources of economic and business statistics information available nationally and internationally			x	x	x	x
Professional competences						
E.P.2. Ability to analyse economic and market indicators when taking decisions within the organisation			x	x	x	x
E.P.21. Ability to research and use various information resources	X			x		
E.P.23. Ability to apply and expand upon abstract reasoning	X			x	x	x
E.P.24. Develop the ability to summarise	X	x	x	x		

6. Bibliography and teaching resources

- **Basic bibliography:**
David S. Moore & George P. McCabe. Introduction to the Practice of Statistics. 6th Edition. Freeman Editors.
- **Supplementary bibliography:**
Paul Newbold, William L. Carlson, Betty Thorne. Statistics for Business and Economics. Pearson Prentice Hall Editors.
- **Learning resources:**
 - AULA ESCI
 - Class notes
 - Lists of Exercises and Solutions
 - Questionnaires
 - Class exercises (responding/uploading in AULA-ESCI)
 - Glossary of terms
- **Software and Statistical packages:**
 - SPSS and Excel (provided by ESCI computer services)
- **Laptops:**
 - The use of computers in classes will be necessary in several sessions. However, the teacher could decide to ban its use whenever appropriate.

7. Methodology

The workload of the course amounts to 150 hours. It is strongly recommended that students follow the work plan outlined in section 8 of this document. Work is divided into 3 types of activities: those developed in class (plenary and seminar sessions), directed, and autonomous work.

Class sessions (39 hours)

- a) *Plenary lessons*: These will be sessions for the whole group where the teacher will introduce and explain the course contents defined in the previous section. These sessions will include definitions, introduction to the most relevant methodologies and examples of each model.
- b) *Seminar sessions*: In the seminar sessions several activities will be undertaken according to the schedule of activities presented in Section 8 of this document:
 - Correction of lists of exercises.
 - Discussion in groups
 - Demonstrating the use of statistical packages.

Directed (47 hours including exams)

- Compulsory readings to prepare for each plenary class (questionnaires to be taken to show understanding of readings at AULA-ESCI).
- Compulsory exercises (exercise lists) to be handed-in.
- Practice quizzes to prepare for exams to solve at AULA-ESCI.
- Mid-term exam.
- Final exam.

Autonomous (64 hours)

- Reading the material provided (slides) and working on comprehension of the topics developed.
- Working on the complementary exercises (those not hand in) and revising solutions with those provided.
- Contributing to the glossary of statistical terms at AULA-ESCI
- Preparing to take examinations.

The following table indicates the number of hours that students should devote to the course:

	Plenary	Seminar	Directed work	Autonomous work	Total
Week 1	3	55	2,5	6	12h 25m
Week 2	3	55	5	6	14h 55m
Week 3	3	55	5	6	14h 55m
Week 4	1,5	55	5	5	12h 25m
Week 5	3	55	2,5	5	11h 25m
Week 6	3	55	4	5	12h 55m
Week 7	3	55	6,5	5	15h 25m
Week 8	3	55	5	5	13h 55m
Week 9	3	55	5	5	13h 55m
Week 10	3	55	2,5	5	11h 25m
Week 11	1,5	0	2	5	9h 25m
Final Exam			2	6	8h 55m
Total	30	9	47	64	150

Allocation of hours between theory and practical lessons (based on the number of credits in the curriculum). In average it amounts to:

- 3 h of plenary lectures and 1 h of seminars weekly.
- 11 h of individual work/week: studying, readings, exercises, and computer practice.

1) Scheduling of activities:

The following table describes the work the student must do during the course. It is structured in the different weeks the term comprises and specifies the deadlines for the submission of hand-outs and questionnaires. It is strongly recommended that students closely follow this plan to pass the course. It is important to bear in mind that no assignment will be taken-in after the deadline is due and that delaying the work to be done will hinder comprehension of class sessions. It is possible that the lecturer needs to modify some date. Students will be warned sufficiently in advance.

COURSE SCHEDULE

Week	Plenary / Seminar	Date	Class activity	Duration h m	Out-of-class directed workload	Duration h m	Due date	Out-of-class autonomous workload	Duration h m
1	Plenary 1	Monday 28/03	Introduction session: Objectives of the course. Syllabus presentation. Grading policy. Class dynamics. Uses of statistics. Basic algebra review.	1 30	Reading Test 1: Moore 5.2 (pp.335-342): The sampling distribution of a sample mean.	2 30	Monday 04/04 8 am	Study of concepts presented in the introduction session, make sure you understand the algebra review and the results of the review quizz	6 0
	Plenary 2	Tuesday 29/03	Topic 1: Sampling distributions and statistical inference	1 30					
	Seminar 1	Friday 01/04	Review Quiz: Answer the review test individually. Discussion in groups: Clarification of basic concepts.	55					
2	Plenary 3	Monday 04/04	Topic 1: Sampling distributions and statistical inference	1 30	Exercise List 1	2 30	Thursday 07/04 before 3pm	Study of concepts in Topic 1 and review Exercise List 1 correction. Do the complementary exercises in the list to ensure understanding and check the solutions provided.	6 0
	Plenary 4	Tuesday 05/04	Topic 1: Sampling distributions and statistical inference	1 30					
	Seminar 2	Friday 08/04	Exercise List 1 correction: Normal distribution computations	55					
3	Plenary 5	Monday 11/04	Topic 2: Point and interval estimation	1 30	Exercise List 2 PART I . Exercises on point estimates	2 30	Thursday 14/04 before 3 pm	Review the solutions to Reading Test 2 . Develop understanding of the link between the contents developed inTopic 2 and those of Topic 1. Familiarize with the language used in statistics (use the glossary in Aula-ESCI).	6 0
	Plenary 6	Tuesday 12/04	Topic 2: Point and interval estimation	1 30					
	Seminar 3	Friday 15/04	Exercise list 2 Part I and dispersion measures	55					
Easter Break									

Easter Break												
4	Plenary 7	Tuesday 26/04	Topic 2: Point and interval Estimation	1	30	Exercise List 2 PART II. Exercises on confidence Intervals	2	30	Before Thursday 28/04 at 3 pm	Study of concepts in Topic 2 and review exercise list 2. Make complementary exercises in the list to ensure understanding and check the solutions provided.	5	0
	Seminar 4	Friday 29/04	Exercise list 2 Part II		55	Reading Test 4: Moore Chapter 6 (pp. 394-399): Use and abuse of Tests.	2	30	Before Monday 02/05 at 8 am			
5	Plenary 8	Monday 02/05	Topic 3: Significance tests: Introduction. One mean test	1	30	Exercise List 3 PART I . One mean significance tests	2	30	Before Thursday 05/05 at 3 pm	Study of concepts in Topic 3. Revise its relation with the concepts developed in Topic 2.	5	0
	Plenary 9	Tuesday 03/05	Topic 3: Significance tests: One mean test	1	30							
	Seminar 5	Friday 06/05	Correcting Exercise List 3 Part I: One.mean tests. Significance test		55							
6	Plenary 10	Monday 09/05	Topic 3: Significance tests: One proportion test	1	30	Exercise List 3 PART II . One proportion significance tests	1	30	Before Thursday 12/05 at 3 pm	Study of concepts in Topic 3. Revise its relation with the concepts developed in Topic 1-2. Review exercise list 3 part I. Make complementary exercises in the list to ensure understanding and check the solutions provided.	5	0
	Plenary 11	Tuesday 10/05	Topic 4: Two means test	1	30							
	Seminar 6	Friday 13/05	Correcting Exercise List 3 Part II: One proportion. Significance tests		55	Reading Test 5: Moore Chapter 9 (pp. 525-530). Analysis of Two-way tables.	2	30	Before Monday 16/05			
7	Plenary 12	Monday 16/05	Topic 4: Two-proportions test	1	30	Practice for the mid-term. Answer to the MID-TERM QUIZZ in AULA-ESCI	2	0	Before Thursday 19/05 at 8 am	Study for the MID-TERM (Topics 1-3). Review concepts studied in Topics 1 to 3. Revisit the exercise list solutions and ensure understanding. Do the complementary exercises to lists 1-3	5	0
	Plenary 13	Tuesday 17/05	5: Chi-Squared tests	1	30	Exercise List 4.	2	30	Before Friday 20/05 at 8 am			
	MID-TERM	Wednesday 18/05				MID-TERM EXAM						
	Seminar 7	Friday 20/05	Correcting Exercise List 4: Two-sample tests.		55							
8	Plenary 14	Monday 23/05	Topic 5: Chi-Squared tests	1	30	Exercise List 5.	2	30	Before Thursday 26/05 at 3 pm	Study of concepts in Topic 4. Make complementary exercises in the list to ensure understanding and check the solutions provided.	5	0
	Plenary 15	Tuesday 24/05	Topic 6: ANOVA	1	30							
	Seminar 8	Friday 27/05	Correcting Exercise list 5: Chi-Squared tests		55	Reading Test 6: Photocopies AULA-ESCI (From Lind, Marchal, and Mason)	2	30	Before Monday 30/05 at 8 am			
9	Plenary 16	Monday 30/05	Topic 6: ANOVA	1	30	Exercise List 6.	2	30	Before Thursday 02/06 at 3 pm	Study of concepts in Topic 5. Review exercise list 5. Make complementary exercises in the list to ensure understanding and check the solutions provided.	5	0
	Plenary 17	Tuesday 31/05	Topic 6: ANOVA	1	30							
	Seminar 9	Friday 03/06	Correcting Exercise list 6: ANOVA		55	Reading Test 7: Moore (pages 108-115) Exclude example 2.13. Moore (pages 559-564).	2	30	Before Monday 06/07 at 8 am			
10	Plenary 18	Monday 06/06	Topic 7: Correlation and Regression	1	30	Exercise List 7.	2	30	Before Thursday 09/06 at 3 pm	Study of concepts in Topic 6. Review exercise list 6. Make complementary exercises in the list to ensure understanding and check the solutions provided.	5	0
	Plenary 19	Tuesday 07/06	Topic 7: Correlation and Regression	1	30							
	Seminar 10	Friday 10/06	Correcting Exercise List 7. Regression		55							
	Plenary 20	Tuesday 14/06 (in Monday's schedule)	Topic 7: Correlation and Regression FINAL REVISION	1	30	Prepare for the final exam doing the preparation QUIZZ. Give your answers in the corresponding questionnaire in AULA-ESCI	2	0	Before the final exam	Study of concepts in Topic 7. Review exercise list 7. Make complementary exercises in the list to ensure understanding and check the solutions provided.	5	0
										Study for the Final Exam	6	0

MID-TERM 2

FINAL EXAM 2

TOTAL CLASS HOURS	39	+	Directed work time	47	Autonomous work time	64
TOTAL HOURS DEVOTED TO THE COURSE	150					