

University of Bath  
Department of Economics and International Development  
EC10003 Introduction to Statistics  
Fall 2007  
Thanos Mergoupis

### Unit Outline

**Lecturer:** Thanos Mergoupis

Room 3 East 4.07

**Contact Hours:** 20 x 1 hour lectures

Weeks 1-11:

Mondays 9:15 - 10:05 2W UN. HALL

Tuesday 13.15 - 14.05 2W UN. HALL

10 x 1 classes beginning week 2

Times and locations TBA

Office Hours:

Wednesday 12.15-14.05

Thursday 10.15-11.05

**Email:** [A.Mergoupis@bath.ac.uk](mailto:A.Mergoupis@bath.ac.uk)

**Assessment:** 30% midterm test  
70% final exam

The midterm mark will count if it is higher than the final mark. Otherwise the final mark will be 100% of the course mark.

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### **Introduction**

Basic statistical knowledge is fundamental to any understanding of applied economic topics (i.e. testing of micro and macro models). The aim, in this respect, is to give you the necessary background for the second year course EC20019 Introduction to Econometrics. More specifically, the unit aims to provide students with a fuller understanding of probability and statistical inference techniques. The learning outcomes are that the students should be able to:

- Calculate probabilities using a variety of discrete and continuous distributions.
- Derive conditional expectation functions.

- Calculate confidence intervals and hypothesis tests for means.

## Course Structure

The course will be taught by two one-hour lectures per week and a one-hour class every week.

Classes start in Week 2 (second week of the semester). The classes are the best way of reinforcing your learning and understanding of the methods and techniques discussed in lectures. There is no substitute for this "learning by doing". Therefore, it is extremely important to your progress in this unit that you prepare for them. You should, at the very least, attempt the assigned exercises **before** the class. It is also very important that you use the provided solutions only as a last resort.

## Required Reading

The required textbook is:

Newbold, Paul., William. L. Carlson, and Betty Thorne. 2006. *Statistics for Business and Economics*. Prentice Hall. 6th edition.

This text will be referred to as NCT.

## Outline

### *PART I: PROBABILITY*

#### 1. Probability Theory

Random experiments, outcomes and events. The nature of probability. Probability rules. Permutations and combinations. Bayes' theorem.

NCT chapter 4.

#### 2. Discrete Random Variables and Probability Distributions

Random variables. Probability distributions for discrete random variables.

NCT chapter 5.

#### 3. Continuous Random Variables and Probability Distributions

Continuous random variables. Expectations. The Normal distribution. Jointly distributed continuous random variables.

NCT chapter 6.

## *PART II: STATISTICAL INFERENCE*

### 4. Sampling and Sampling Distributions

Sampling from a population. Sampling distribution of the sampling mean, sample proportion, and sample variance.

NCT chapter 7.

### 5. Estimation

Point estimators. Confidence intervals. Sample size determination.

NCT chapter 8.

### 6. Hypothesis Testing

Concepts of hypothesis testing. Hypothesis tests for mean and variance. Power of a test.

NCT chapter 9.

### What your lecturer expects from you and what you should expect from your lecturer

#### Attendance

1. Students are strongly encouraged to attend every lecture.
2. Students should refrain from talking to each other or otherwise disturbing the course of the lecture. This is disruptive to the lecturer and to other students. Students who cause such disruption may be asked to leave the lecture room.
3. Students are encouraged to interrupt the lecture with relevant questions.

#### Lecture notes and other teaching material

4. Every effort is made to provide lecture notes on the unit web site before the lecture, and students are advised to print them and bring them to the lecture. The lecturer cannot guarantee however that the lecture notes will be on the unit website before *every* lecture. Note also that lecture notes on the web may be occasionally revised.
5. The weekly problem sets will also be posted on the unit website.

6. Every effort will be made to provide answers to these problems, but there is no guarantee that answers will be provided to all problems.

7. Although every care is taken to avoid errors, they often do creep into lecture notes and solutions. If such errors are spotted please report them to the lecturer.

### Office hours

8. Office hours are made available to students for the discussion of any problems or questions arising from the unit. Because of large numbers of students, there will be no availability of the lecturer outside the office hours. To make sure that you meet the lecturer during the office hours, use the sign-up sheet on the door. Students are therefore encouraged to seek clarifications early on during the term and avoid periods of heavy demand.

9. Students wishing to discuss assigned problems are encouraged to come to either the lecturer's or the class tutor's office hours. They are expected to have worked on the problems/questions they wish to discuss and they should bring with them and present all the relevant work.

### Email

10. Students will be receiving emails from the lecturer addressed to their University assigned email address. Students are responsible for every communication sent by the lecturer to their address. No alternative addresses can be used. Students are therefore responsible for making sure that their University email facilities are in working order and their inboxes are not full.

11. Every effort will be made to answer emails. However:

--Emails asking things clarified in lectures or in the teaching material will normally be ignored.

--Emails inquiring about issues concerning all or most students, may be answered during the lecture.

### Exams

12. Students tested in unseen exams/tests should expect to be informed of:

(a) The material covered by the exam/test. Ordinarily this includes (i) lecture content; (ii) lecture notes; (iii) assigned readings; (iv) assigned problems.

(b) The format of the exam/test. This means: (i) the number of sections and/or questions of the exam/test, and number expected to complete; (ii) the format of the questions, i.e. true or false, multiple choice, or full answers.

This implies that absolutely no information will be given on the content of the exam/test. In particular, no information will be given on whether questions would require a quantitative or a verbal answer, on whether questions will cover more than one section of the unit, etc.

### Exams from previous years

13. Students may choose to work on questions from previous years' exams/tests (in addition to those assigned as part of the assigned problems) for practice purposes and using their own judgment as to their relevance for the current unit. The lecturer may provide some solutions to them. However, neither the content nor the difficulty of previous years' exam questions would in any way indicate the content or the difficulty of current year's exams.

### Assessment procedures in other units

14. Assessment procedures in other units may differ from assessment procedures in this unit in a number of ways. For example, in terms of (i) the weights of assessed components; (ii) information given in relation to the exam; (iii) uses and relevance of previous years' exams, etc. Note carefully that any such differences have no bearing whatsoever on the assessment procedures of this unit.

In relation to this point students must understand:

The assessment rules vary depending on the subject and the content of a unit and the teaching approach of the lecturer. For example, units emphasising techniques may require a different teaching approach from units emphasising critical thinking. This in turn necessitates different assessment procedures. There are units emphasising breadth of coverage while others emphasise depth, again implying different teaching approaches and assessment methods.

### General comment

15. This unit emphasises teaching particular ways of thinking about problems. Therefore there is little or no weight placed on obtaining a correct answer and most or all the weight placed on using the appropriate methods. There have been instances where students obtain the correct answer (strictly speaking, an answer that coincides with the correct one) using wrong methods, and as a result receive low or zero marks. Alternatively, students obtaining the wrong answer because of arithmetic mistakes but otherwise using the appropriate methods, may receive high or full marks.