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| **Title** | | | | **Quantitative Methods for Finance** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| **Lecturer** | | | | **Kyung Yoon Kwon** | | | | | | | | | | Tutors | | | | TBC | | | | | | | | | | | | | |
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|  | | Code | | | AG909 | | | Semester | | | 1 | | Weeks | | | | | | 1 – 11 | | | Credits | | | | 20 | | |  | | |
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|  | **Assessment** | | | | |  | Examination | | | | 70% | | | |  | | Coursework | | | |  | | |  | Test | | 30% | | |  | |
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|  | Finance | | Compulsory | | | | | |  | Int. Banking & Fin. | | Compulsory | | | |  | Investment & Fin. | | | Compulsory | | |  | Int. Accounting & Fin. | | | | Compulsory | | |  |
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## CLASS AIMS

This class aims to provide an introduction to statistical techniques that are commonly used in finance, a basic understanding of econometric analysis, and an appreciation of the general role of quantitative methods in finance. The class will focus on the application of statistical techniques to examine empirical issues in finance, such as corporate finance and stock price analysis.

## LEARNING OUTCOMES

The class provides opportunities for students to develop and demonstrate knowledge, understanding and skills in the following areas:

**i) Knowledge Based Outcomes:**

On completion of the class students will be able to:

* develop and employ the basic statistical concepts involved in the descriptive analysis of data,
* understand the concepts of random variables and probability distributions with particular reference to financial data,
* draw inferences and conclusions from statistical analysis;
* select appropriate estimation techniques;
* understand the linear regression model and apply it to financial and economic data
* evaluate empirical research in finance.

**ii) Skills Outcomes:**

On completion of this class students should be able to demonstrate that they can:

* describe the major features of data sets and identify their distributional properties,
* test hypotheses and draw inferences,
* identify the cause/outcome of relationships between two variables,
* apply linear regression techniques and interpret the results, and
* apply basic statistical methods in solving problems.

**TEACHING AND LEARNING**

The module will be delivered by a combination of lectures and tutorials (workshop) sessions (delivered via combinations of online, video-recorded and face-to-face sessions). Quantitative techniques will be discussed in the context of their application in solving finance problems. While the lectures focus more on the methodological and technical aspects involved in quantitative analysis, the tutorials will provide hands-on practical experience on applying statistical and econometric tools in solving real world finance problems. Where appropriate, references will be made to the use of such techniques in research papers and/or their use in the finance sector.

**ASSESSMENT**

A class test will account for 30 percent and the final examination for 70 percent of the assessment (assessments will take place online via Myplace). The class test will consist of a number of multiple choice questions (numerical and conceptual) and will provide an indication of students’ understanding of relevant analysis, its underlying assumptions and ability to apply the analysis to relevant finance problems. The final examination will consist of quantitative (numerical) and short essay (conceptual/theoretical) questions. It will take place in the December diet of examinations and last three hours. Any reassessment will be via a re-sit exam of the same format as the main exam. Class participants will be expected to complete some assignments for workshops and will be provided with proposed solutions to the activities developed during the workshops as to assist on their understanding of the analysis, but these will not be part of the formal assessment scheme.

**READING**

Slides containing class notes will be made available to class participants.

The recommended textbook for the course is:

*Introductory econometrics: a modern approach,* by Wooldridge, Jeffrey.

The relevant sections of the book covered in the course and specific recommended readings will be discussed during class.

**Web Resources**

Any Web resources will be communicated to participants during class.

**Useful Websites:**

Any Web resources will be communicated to participants during class.

## LECTURE PROGRAMME

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| **Session** | **Lecture Title/Subject/Content** |
| **1-2** | Introduction to the types (time series, cross-section, panel, continuous, discrete) and major sources of data that are commonly used in financial economics; Descriptive statistics:  measures of central tendency, dispersion, and association. |
| **3** | Probability; discrete and continuous random variables; expectation; joint probability distributions; |
| **4-5** | Sampling: samples and populations; random sampling; Hypotheses testing: null and alternative hypotheses; type one and type two errors; test procedures; applications to single samples and two independent samples. |
| **6-7** | Simple regression analysis: the mechanics of ordinary least squares (OLS) regression and its assumptions; hypothesis tests of regression parameters and construction of confidence intervals; the coefficient of determination (R-square) and explained variance. Running a simple linear regression using software (Excel). |
| **8-10** | Multiple regression analysis and its assumptions. The regression significance (F) test. Dummy variables. Models with non-linear effects. Models with interaction effects. An introduction to Panel data models. Running a multiple regression using software (Excel). |
| **11** | Revision |