Dept of Economics
UNIVERSITY OF CRETE

SYLLABUS OF BASIC COURSES

ACADEMIC YEAR 2024/2025

Rethymno, 04 February 2025

INTRODUCTION TO ECONOMIC THEORY - OIK1007

Course Objectives

The objective of this course is to introduce students to the study of Economics and provide them with the necessary tools to understand fundamental concepts and develop an intuitive understanding of the more general economic methodology. Thus, it helps students with the mapping of the main economic concepts and their interconnection in a coherent basis. Participants are introduced to market structure and operation, the decision-making process of producers and consumers, the operation of government and monetary intervention, the interrelationship of endogenous and exogenous factors, and their effects on individual and social development and well-being.

Instructors

Apostolakis George - Adam Christos

Course Web Page

https://econservices.soc.uoc.gr/econ_classes/course/view.php?id=128

Prerequisites

The course is introductory and does not require prior knowledge.

Learning Outcomes and General Competencies

Upon successful completion of the course, participants are expected to possess the following knowledge:

- To have understood the importance and role of Economics.
- To recognize the basic form of the economic problem in everyday, contemporary and timeless issues.
- To capture key issues of financial analysis in mathematical and diagrammatic form.
- To know the basic principles of market operation and price determination.
- To know the characteristics of the main forms of market and its differentiation factors.
- Have basic knowledge of Microeconomics, Macroeconomics, Trade Theory and Welfare Economics.

Expected general skills:

- Inductive thinking.
- Economic environment analysis.

Assessment method

The assessment is based on a final written exam.

Tutoring courses

Not offered.

Basic textbook

Begg D., Vernasca G., Fisher S. and Dornbusch R. (2023). **Introduction to Economics (4th edition)**, Kritiki Publishing, Athens (in Greek).

Supplementary material

Mankiw N.G. and Taylor P.M. (2024). **Economics (6th edition)**, Tzola Publishing, Thessaloniki (in Greek).

Acemoglu, D., Laibson, D. and List, J. (2018). **Economics (2nd edition)**, Pearson Education, Boston.

Hubbard, G. and O"Brien, A. (2019). **Economics (7th edition)**, Pearson Education, Boston.

O"Sullivan, A., Sheffrin, S. and Perez, S. (2017). **Economics: Principles, Applications, and Tools (8th Edition)**, Pearson Education, Boston.

Course load per semester (in hours)

Lectures	Tutorials	Individual effort	Total
39	12	149	200

Lectures

Lecture 1: Introduction to basic concepts

Begg et al. chapter 1

- The importance of economic science and the social and developmental role it performs.
- The basic economic agents and the main external factors in the economy.
- The fundamental resource management problem that characterizes every economic choice and decision process.
- Microeconomics and Macroeconomics distinction.
- The role of the market.

Lecture 2: Analysis tools and financial decisions

Begg et al. sections 2.1-2.6 and 3.1. Instructor’s notes

- The economic data.
- Nominal and real variables.
- Measurement of economic variables.

- Economic models and data.
- Introduction to the supply-demand model and how the market works.
- Producer and consumer decisions that lead to demand-supply and equilibrium decisions.

Lecture 3: Optimization of producer and consumer

Instructor's notes. Supplement: Chiang, A. (2009) Mathematical Methods of Economic Analysis

- Introduction to mathematical optimization and optimizing behavior.
- Independent and dependent variables.
- The objective function, constrained optimization and the value function.
- The envelop theorem.
- The origins of demand and supply.

Lecture 4: Market function and elasticities

Begg et al. chapters 3 and 4

- Demand, supply and balance.
- Shifts of demand and supply curves and analysis of the factors affecting them.
- Producer, consumer and social surplus.
- Maximum and minimum price results.
- Surplus and shortage of quantity supplied and demanded.
- The deadweight loss.

Lecture 5: Consumer and producer decisions

Begg et al. chapters 5 to 7

- Consumer decisions and demand.
- Adjustment to price and income changes.
- Complementary and substitute goods.
- Business and profit maximization.
- Marginal cost and marginal revenue.
- Diminishing marginal returns.
- Inputs and output.
- Returns to scale.

Lecture 6: Market structures

Begg et al. chapters 8 and 9

- Monopoly, perfect and imperfect competition.
- Impact on price and profitability.

- Comparing social surplus between monopoly and perfect competition.
- Introduction to game theory.

Lecture 7: Labor and input markets. Distribution of income

Begg et al. chapters 10 and 11

- Natural capital.
- Rents, interest rates and asset prices.
- Saving, investing and real interest.
- Equilibrium and adjustment of the capital services market.
- Land and rent revenue.

Lecture 8: Economic decisions under uncertainty

Begg et al. chapter 12

- Decision making under imperfect information.
- Forms of uncertainty and Knightian uncertainty.
- Risk and information.
- Asymmetric information.
- Modern theories in decision analysis under uncertainty.

Lecture 9: Welfare economics and the public sector

Begg et al. chapters 13 and 14

- Fairness and efficiency.
- Perfect competition and Pareto efficiency.
- Distortions and the second best solution.
- Market failure.
- Externalities.
- Environmental issues and the economics of climate change.
- Taxation and public spending.

Lecture 10th: Introduction to Macroeconomic concepts

Begg et al. chapters 15 and 16

- The economic circle.
- Schools of Economic thought.
- The national accounts.
- What does gross domestic product measure? International comparisons.
- Aggregate measures and equilibrium.

- The multiplier.
- The paradox of thrift.

Lecture 11th: Economic policies and analysis of money

Begg et al. chapters 17, 18 and in summary sections 24.1-24.3 and 26.1

- Fiscal and monetary policy.
- Expansionary and restrictive policies.
- The state budget.
- Public debt and deficit.
- Role and function of money.
- Interest rates, inflation.
- Exchange rate.
- The gold standard.

Lecture 12th: Economic development, growth and international trade

Begg et al. chapters 28 and 29

- Economic growth measurement and indicators.
- Differences between economic growth and development.
- Factors affecting economic growth.
- Economic trade and comparative advantage.
- Closed and open economy.

Lecture 13: Review and preparation for final exams

STATISTICS I - OIK1003

Course Objectives

The purpose of the course Statistics I is for the first year students to understand the notion of randomness and to associate it with real data collection. First, data are visualised and basic statistical measures are considered. Second, the notion of probability is considered and is associated with random phenomena. Third, the idea of random variables and its distributions is adopted in order to connect the sample with population.

Instructors

Daskalaki Charoula - Tsiotas Georgios - Tsagris Michail

Course Web Page

https://econservices.soc.uoc.gr/econ_classes/course/view.php?id=11

Learning Outcomes and General Competencies

On successful completion of the course, the students will be able to:

- To understand data collection and presentation.
- To comprehend the univariate data analysis and its statistical measures.
- To comprehend the bivariate data analysis and its statistical measures.
- To understand the laws of probability.
- To learn how probability theory and its distributions are associated with randomness in population.

This course will provide students with an opportunity to develop the general competencies specified below:

- Search, analyze, and synthesize information using the appropriate tools and technologies.
- Decision making.
- Adjustment to new circumstances.
- Critical thinking and problem solving.

Assessment method

The assessment is based on a written exam (in the form of essay type or multiple-choice questions) held upon completion of a course at the end of the semester, which counts for the 100% of the total grade.

Tutoring courses

The course will include **four (4)** three-hour tutorials, which aim to support students' full comprehension of the teaching material.

Basic textbook

Tsiotas, G. (2022). **Lessons in Statistics**, Pedio Publishing, Athens (in Greek).

Supplementary material

Berenson L.M., Levine M.D. and Szabat A.K. (2019). **Basic Business Statistics**, Broken Hill Publishing, Athens (in Greek).

Course load per semester (in hours)	Lectures	Tutorials	Individual effort	Total
	39	12	149	200

Lectures

Week 1: Basic Statistics

Tsiotas, chapter 1 (1.1-2)

- random variable,
- sample, types of random variables,
- frequencies, cumulative frequencies.

Week 2: Location Statistical Measures

Tsiotas, chapter 1(1.3)

- mean, median, quantiles, percentiles, mode.

Week 3: Dispersion Statistical Measures

Tsiotas, chapter 1(1.4)

- variance, coefficient of variation, standard deviation,
- asymmetry, skewness.

Week 4: Bivariate Data Analysis

Tsiotas, chapter 1(1.5)

- covariance function, correlation function.

Week 5: Probability I

Tsiotas, chapter 2(2.1-2)

- axioms, the additive law.

Week 6: Probability II

Tsiotas, chapter 2(2.2)

- independence, low of total probability, conditional probability.

Week 7: Probability III

Tsiotas, chapter 2(2.2)

- Bayesian theory, Bayesian trees.

Week 8: Discrete Random Variables I

Tsiotas, chapter 2(2.3)

- probability function, cumulative probability function.

Week 9: Discrete Random Variables II

Tsiotas, chapter 2(2.3)

- Bernoulli distribution, Binomial distribution, Poisson distribution.

Week 10: Continuous Random Variables I

Tsiotas, chapter 2(2.3)

- probability density function,
- cumulative probability density function.

Week 11: Continuous Random Variables II

Tsiotas, chapter 2(2.3)

- Normal distribution,
- Standard Normal distribution.

Week 12: Bivariate Random Variables

Tsiotas, chapter 2(2.3)

- probability density function,
- cumulative probability density function.

Week 13: Review classes

STATISTICS II - OIK1006

Course Objectives

The purpose of the course Statistics II is for the first year students to connect sampling with population using statistical inference tools. First, sampling and its measures is associated with some theoretical distributions such as: the Normal, the Student-t and the Chi-square. Second, the some statistical testing techniques are used to answer statistical questions in population. Third, the idea of confidence intervals is adopted as an additional statistical inference technique.

Instructors

Tsagris Michail - Tsiotas Georgios - Genius Margarita

Course Web Page

https://econservices.soc.uoc.gr/econ_classes/course/view.php?id=13

Learning Outcomes and General Competencies

On successful completion of the course, the students will be able to:

- To understand the difference between sample and population.
- To learn sampling methods and their properties.
- To associate sampling results with population ones using statistical inference tools, such as hypothesis testing and confidence intervals.

This course will provide students with an opportunity to develop the general competencies specified below:

- Search, analyze, and synthesize information using the appropriate tools and technologies.
- Decision making.
- Adjustment to new circumstances.
- Critical thinking and problem solving.

Assessment method

The assessment is based on a written exam (in the form of essay type or multiple-choice questions) held upon completion of a course at the end of the semester, which counts for the 100% of the total grade.

Tutoring courses

The course will include **four (4)** three-hour tutorials, which aim to support students' full comprehension of the teaching material.

Basic textbook

Tsiotas, G. (2022). **Lessons in Statistics**, Pedio Publishing, Athens (in Greek).

Supplementary material

Berenson L.M., Levine M.D. and Szabat A.K. (2019). **Basic Business Statistics**, Broken Hill Publishing, Athens (in Greek).

Course load per semester (in hours)	Lectures	Tutorials	Individual effort	Total
	39	12	149	200

Lectures

Week 1: Continuous Random Variables III

Tsiotas, chapter 2(2.3)

- the Student-t, the Chi-square and the F-distributions.

Week 2: Sampling

Tsiotas, chapter 2(2.4)

- Large sample theory, types of sampling, distribution of sampling measures.

Week 3: Estimation

Tsiotas, chapter 2(2.4)

- Sampling estimation, the least squared method, the maximum likelihood method.

Week 4: Properties of Sampling Measures

Tsiotas, chapter 2(2.4)

- the unbiased property, the efficiency property, the Cramer-Rao bound.

Week 5: Statistical Inference I

Tsiotas, chapter 3(3.1-3)

- the notion of hypothesis testing, the types of errors, the p-value.

Week 6: Statistical Inference II

Tsiotas, chapter 3(3.4)

- hypothesis testing in the proportion, hypothesis testing in the proportion of two populations.

Week 7: Statistical Inference III

Tsiotas, chapter 3(3.5)

- hypothesis testing in the mean, hypothesis testing in the mean of two populations.

Week 8: Statistical Inference IV

Tsiotas, chapter 3(3.6-7)

- hypothesis testing in the variance, goodness-of-fit hypothesis testing.

Week 9: Statistical Inference V

Tsiotas, chapter 3(3.8,3.11)

- independence hypothesis testing, normality hypothesis testing.

Week 10: Statistical Inference VI

Tsiotas, chapter 3(3.12)

- confidence interval in the mean, confidence interval in the mean of two populations.

Week 11: Statistical Inference VII

Tsiotas, chapter 3(3.12)

- confidence interval in the proportion, confidence interval in the proportion of two populations.

Week 12: Statistical Inference VIII

Tsiotas, chapter 3(3.12)

- confidence interval in the variance, measuring the optimal sample size, confidence interval and maximum likelihood estimators.

Week 13: Review classes

MATHEMATICS I - OIK1001

Course Objectives

In this first course of Mathematics the objective is to introduce the students to basic mathematical concepts, techniques and methods, necessary in Economics. The students will come into contact with

- Real functions of one variable with emphasis on the investigation of local behavior and extrema and elements of integral calculus, essential in economic analysis.
- Elements of linear algebra and in particular matrix algebra for solving systems of linear equations.
- Real multivariable functions with emphasis on finding local extrema and the concept of unconstrained and constrained optimization under equality constraints (Lagrange's method).

Instructors

Pigounakis Kostis - Tsagris Michail

Course Web Page

https://econservices.soc.uoc.gr/econ_classes/course/view.php?id=519

Prerequisites

This course does not require knowledge of other subjects. Nonetheless it assumes familiarity to the curriculum of Mathematics for the Greek National Admission Exams.

Learning Outcomes and General Competencies

Upon successful completion of the course, the students will acquire the ability to understand and handle the mathematical tools required for the formulation and treatment of economic science problems.
The general skills that students will acquire through the course are decision-making and independent work.

Assessment method

The evaluation is based on the following **MANDATORY** procedures:

- A series of automated **self-assessment tests**.
- A **series of exercise** sets to be solved and corrected.
- A **final written examination** with a weighting of **at least 70% of the final grade**, administered according to the Department's fall semester examination schedule.
  In case of re-evaluation during the September examination, the grade is calculated only from the written examination.

Tutoring courses

For a better understanding of the material, tutorial lectures are held, covering the most important topics of the material by solving examples and exercises.

Basic textbook

Hoy, M., Livernois, J., McKenna, C., Rees, R. and Stengos, T. (2011). **Mathematics for Economics (2nd Edition)**, Gutenberg Publishing, Athens (in Greek).

Chiang A., and K. Wainwright (2009). **Fundamental Methods of Mathematical Economics (4th Edition)**, Kritiki Publishing, Athens (in Greek).

Supplementary material

Xepapadeas, A. (2009). **Mathematical Methods in Economics – Theory and Applications (Volume A)**, Gutenberg Publishing, Athens (in Greek).

Loukakis, M. (2012). **Invitation to the Mathematics of Economics and Management Sciences (Volumes A & B)**, Sofia Publishing, Thessaloniki (in Greek).

Course load per semester (in hours)

Lectures	Tutorials	Individual effort	Total
39	40	121	200

Lectures

Week 1: Introduction to Real Analysis and Linear Algebra

Hoy et.al., Chs. 1-2; Chiang, Chs. 1-3; Xepapadeas, Introduction - Ch. 1;Loukakis, Vol. A, Chs.1-5

- Mathematical Economic models.
- Basics of Real analysis of one variable. Types of real functions. Polynomials. Graphs.
- Sequences- Series. Arithmetic and Geometric sequences.
- Economic equilibrium.

Week 2: Univariable Functions – Limit, Continuity, Monotonicity, Derivative

Hoy et.al., Ch. 4; Chiang, Chs. 6,7; Xepapadeas, Chs. 2,4,5; Loukakis, Vol. A, Chs. 9-14

- Definition of real functions of one variable and their fields of definition. Basic real functions.
- Limit and continuity of real functions - Continuous functions.
- Monotonicity.
- Definition of the derivative and the differential of a function. Average and Marginal magnitude. Elasticity.

Week 3: Local Investigation and Extrema of Univariable Functions

Hoy et.al., Ch. 6; Chiang, Ch. 9; Xepapadeas, Ch. 5; Loukakis, Vol. A, Chs. 12-14

- The concept of convexity. Convex and concave functions.
- First and second derivative criterion for determining extreme values in functions of one real variable.
- Taylor/McLaurin expansions.

Week 4: Exponential and Logarithmic Functions

Chiang, Ch. 10; Xepapadeas, Ch. 4; Loukakis, Vol. A, Ch. 6

- Extensive reference to the proprties of the exponential and the logarithmic functions
- Applications of exponential and logarithmic functions in economics.

Weeks 4-5: Integrals

Hoy et.al., Ch. 16; Chiang, Ch. 14; Xepapadeas, Chs. 10-11; Loukakis, Vol. A- Chs. 15-17

- Introduction to integrals. Indefinite integrals.
- Definite integrals.
- Generalized integrals.
- Economic applications of integrals.

Week 6: Algebra of Matrices and Determinants

Hoy et.al., Chs. 7,8; Chiang, Chs 4,5; Xepapadeas, Ch.6; Loukakis, Vol. A, Chs. 19-21

- Definition and types of matrices. Inversion of a matrix and properties.
- Algebraic operations with matrices. Addition, multiplication and linearity properties.
- Multiplication of matrices and powers with positive exponent.
- Introduction to determinants and their calculation methods.

Week 7: Inverse Matrices and Introduction to Linear Systems

Hoy et.al., Chs. 8,9; Chiang, Ch. 5; Xepapadeas, Chs. 6, 7; Loukakis, Vol. A, Chs. 20,21

- Calculations and Properties of determinants.
- Definition of inverse matrix and method of calculating it. Applications with invertible matrices.
- Matrix formulation of a system of linear equations.

Week 8: Solving Linear Systems – Eigenvalues and Eigenvectors

Hoy et.al., Chs. 9-10; Chiang, Ch. 5; Xepapadeas, Vol. A, Ch. 6,7; Loukakis, Vol. A, Chs. 20,21, Vol. B, Chs. 6-7

- Inverse matrix method. Solving a linear system by finding the inverse matrix of the coefficients of the unknowns.
- Solving systems by the method of determinants.
- The cases of none, unique and infinite solutions. Emphasis on the cases of systems with the same number of equations and unknowns.
- Eigenvalues and eigenvectors. Definition of the eigenvalue of a matrix and its calculation. Definitions of eigenvectors.
- Quadratic forms.

Week 9: Introduction to Multivariable Functions

Hoy et.al., Ch. 11; Chiang, Ch. 7; Xepapadeas, Ch. 8,9; Loukakis, Vol. B, Chs. 1,3

- Real multivariable functions. Fields of definition and values.
- Limit and continuity of multivariable functions.
- Partial derivation - The gradient vector - Isostatic curves.
- Partial derivatives of higher order.

Week 10: Total Differential and Derivatives. Derivatives of Vector Functions. Implicit Functions

Hoy et.al., Ch. 11; Chiang, Chs. 7-8; Xepapadeas, Ch. 8; Loukakis, Vol. B, Chs. 4,5

- Total differential - Total derivatives.
- Concepts of derivatives in vector functions using the Jacobian matrix. Functional independence.
- Functions defined implicitly. Derivation of implicit functions.

Week 11: Local Investigation and Extrema of Multivariable Functions

Hoy et.al., Ch. 12; Chiang, Ch. 11; Xepapadeas, Ch. 8; Loukakis, Vol. A-Ch. 24

- Determination of stationary points in multivariable functions - The concept of the gradient vector.
- Convex and concave functions in n-dimensional real space. Finding the subsets of the domain of definition with convex or concave behaviour, by means of the Hessian matrix and its eigenvalues.
- Local extrema and saddle points of multivariable functions.

Week 12: Optimization of Multivariable Function under Equality Constraints

Hoy et.al., Ch. 13; Chiang, Ch. 12; Loukakis, Vol. A-Ch. 24, Vol. B-Ch. 10

- Presentation of the constrained optimization problem.
- The Lagrange function. The Lagrange multiplier and its economic interpretation.
- Determination of bounded edges using the bordered Hessian matrix.
- Cobb-Douglas functions. Homogeneous Functions.

Week 13: Review and Preparation for Final Exams

MATHEMATICS II - OIK1004

Course Objectives

The objective of this course is to introduce students to the mathematical concepts, techniques and methods necessary in Economics. The subject of study in this course is linear and non-linear programming, differential equations, equations of differences and dynamic optimization.

Instructors

Tsagris Michail

Course Web Page

http://econservices.soc.uoc.gr/econ_classes/enrol/index.php?id=55

Prerequisites

Sufficient knowledge of Mathematics I(ECO1001).

Learning Outcomes and General Competencies

On successful completion of the course, the students will be able to:

- Solve non-linear programing problems.
- Solve specific cases of differential equations.
- Solve specific cases of equations of differences.
- Solve dynamic optimization problems.
- Understand mathematical tool in order to understand basic economic phenomena.
- Use mathematical tool in order to understand basic economic phenomena.

Assessment method

The assessment is based on a final written exam. During the course two online quizzes, mark-free will be given in order to help the student with their reading.

Tutoring courses

There is a number of tutorials conditional upon the availability of teaching personnel.

Basic textbook

Supplementary material

Course load per semester (in hours)	Lectures	Tutorials	Individual effort	Total
	39	12	149	200

Lectures

Week 1: Mathematical programming

(Chapter 13)

- Linear programming. Optimization problems with inequality constraints.
- Optimal solution with linear objective function and constraints.

Week 2: Primary and dual problem in optimization

(Chapter 13)

- Definitions and basic relationships.
- Properties between the two problems.
- Applications in economics.

Week 3: Non-linear programming

(Chapter 13)

- General statement of the problem.
- Kuhn Tucker conditions.
- Kuhn-Tucker theorem for the optimal solution.

Week 4: 1st order differential equations

(Chapter 15)

- Introduction, terminology and basic concepts.
- Ordinary 1st order differential equations.
- Solution algorithms.

Week 5: Higher order differential equations

(Chapter 16)

- 2nd order differential equations.
- Higher order differential equations.
- Solution algorithms, stability and applications in economic analysis.

Week 6: Qualitative analysis

(Chapter 17)

- Qualitative analysis and phase diagrams.
- Overview in differential equations.
- Applications in economic analysis.

Week 7: Systems of differential equations

(Chapter 19)

- Definition of systems. Linear and non-linear systems.
- Solution algorithms for systems of differential equations.
- Applications in economic analysis.

Week 8: Stability of the solutions of systems of differential equations

(Chapter 19)

- Linear systems and stability of their solutions.
- Non-linear systems.
- Linearization of non-linear systems.

Week 9: Equations of differences

(Chapter 17)

- 1st and 2nd order equations of differences
- Applications in economic analysis.

Week 10: Systems of equations of differences

(Chapter 17)

- Definitions.
- Solution algorithms.
- Applications in economic analysis.

Week 11: Dynamic optimization

(Chapter 20)

- Introduction and definitions of the general form of problems.
- Basic terminology.

Week 12: Maximum principle

(Lecture Notes)

- Modified Hamiltonian system.
- Sensitivity analysis
- Finite time problem

Week 13: Revision

MACROECONOMICS I - OIK1002

Course Objectives

This course introduces students to the Macroeconomic Theory focusing on a closed-economy analysis. This course presents fundamental macroeconomic concepts, such as the Gross Domestic Product (GDP), the inflation rate, the unemployment rate, the business (or economic) cycle, etc. Moreover, the course focuses on the analysis of short-run economic fluctuations and discusses the way the interdependence between goods and money markets affects short-run and long-run equilibrium. The implementation of macroeconomic policy (fiscal and monetary) is also studied during the course.

Instructors

Kalaitzidakis Pantelis - Giannellis Nikolaos - Koukouritakis Minoas

Course Web Page

http://econservices.soc.uoc.gr/econ_classes/course/view.php?id=10

Prerequisites

Sufficient knowledge of introductory concepts of Macroeconomics (ECO1007) and Mathematics (ECO1001).

Learning Outcomes and General Competencies

On successful completion of the course, the students will be able to:

- Understand fundamental concepts, such as GDP, business cycle, inflation, unemployment, etc.
- Understand the concept of fiscal multiplier.
- Understand the short-run economic fluctuations through the IS-LM model.
- Understand the equilibrium in the money market and the role of the Central Bank.
- Understand how prices, output and employment are determined in short-run and long-run equilibrium.

Assessment method

The assessment is based on a final exam.

Tutoring courses

The course will include four (4) three-hour tutorials, which aim to support students' full comprehension of the teaching material.

Basic textbook

Supplementary material

Course load per semester (in hours)	Lectures	Tutorials	Individual effort	Total
	39	12	149	200

Lectures

Week 1: Introduction to Macroeconomic Theory

Abel, Bernanke and Croushore (2017), ch. 1, 2 and 3.6.

Mankiw (2019), ch. 1, 2 and 10.1.

Dornbusch & Fisher (1993), ch. 1 and 2.

- Basic concepts
- Aggregate Demand – Aggregate Supply
- National Identities

Week 2: GDP: Income – Spending

Abel, Bernanke and Croushore (2017), ch. 3.

Mankiw (2019), ch. 3 and 11.1.

Dornbusch & Fisher (1993), ch. 3.

- Consumption function
- Consumption – Savings
- Equilibrium
- Fiscal Multiplier

Week 3: IS-LM Model I

Abel, Bernanke and Croushore (2017), ch. 9.

Mankiw (2019), ch. 11.

Dornbusch & Fisher (1993), ch. 4.

- Goods Market Equilibrium
- Money Market Equilibrium
- Slopes of IS and LM curves

Week 4: IS-LM II

Abel, Bernanke and Croushore (2017), ch. 9.

Mankiw (2019), ch. 11.

Dornbusch & Fisher (1993), ch. 4.

- Equilibrium
- Monetary Policy
- Fiscal Policy

Week 5: AD-AS model

Abel, Bernanke and Croushore (2017), ch. 9.

Mankiw (2019), ch. 10 and 12.2.

Dornbusch & Fisher (1993), ch. 7.

- Aggregate Demand and IS-LM
- Keynesian Aggregate Supply
- Classical Aggregate Supply

Week 6: Aggregate Supply I

Abel, Bernanke and Croushore (2017), ch. 9, 10.4-10.5 and 11.3.

Mankiw (2019), ch. 10 and 12.2.

Dornbusch & Fisher (1993), ch. 7.

- Monetary Policy
- Fiscal Policy
- Alternative slopes

Week 7: Aggregate Supply II

Abel, Bernanke and Croushore (2017), ch. 9, 10.4-10.5 and 11.3.

Mankiw (2019), ch. 10 and 12.2.

Dornbusch & Fisher (1993), ch. 7.

- Quantity Theory
- Monetarism
- Lucas AS curve

Week 8: Money Demand

Abel, Bernanke and Croushore (2017), ch. 7.

Mankiw (2019), ch. 4 and 5.1.

Dornbusch & Fisher (1993), ch. 10.

- Money definition
- Money demand function
- Theories of Money Demand

Week 9: Money Supply

Abel, Bernanke and Croushore (2017), ch. 14.

Mankiw (2019), ch. 4.

Dornbusch & Fisher (1993), ch. 11.

- Monetary Base
- Money Multiplier
- Money Market Equilibrium
- Money Supply Control

Week 10: Labor Market and Unemployment

Abel, Bernanke and Croushore (2017), ch. 11 and 12.

Mankiw (2019), ch. 7.

Dornbusch & Fisher (1993), ch. 13.

- Neoclassical model
- NAIRU
- Wage Rigidity
- Supply Shocks

Week 11: Inflation

Abel, Bernanke and Croushore (2017), ch. 12.

Mankiw (2019), ch. 14 and 15.

Dornbusch & Fisher (1993), ch. 14.

- Inflation Expectations
- Expected Inflation and Wage
- Long-run AS

Week 12: Inflation and Unemployment

Abel, Bernanke and Croushore (2017), ch. 12.

Mankiw (2019), ch. 7 and 15 and ενότ. 5.5-5.6 and 14.2.

Dornbusch & Fisher (1993), ch. 14 and 15.

- Types of Unemployment
- The Cost of Inflation
- Phillips Curve

Week 13: Review

- Questions and answers
- Final exam details

MACROECONOMICS II - OIK2001

Course Objectives

The main objective of this course is to analyze the general equilibrium of an open economy. Within this course, important issues of international macroeconomics are analyzed, such as the foreign exchange market, the concept of the balance of payments, the effects of macroeconomic policy in an open economy, and finally the European Monetary System (EMS) and moving to the Economic and Monetary Union (EMU). More specifically, the first part of the course will analyze the foreign exchange market and the interest parity conditions (uncovered and covered interest parity). The second part of the course will analyze the balance of payments and its adjustment. The third and most important part of the course analyzes the implementation of macroeconomic policy in an open economy. The effectiveness of fiscal and monetary policies is directly related to whether restrictions are imposed on capital mobility or not, as well as to the prevailing exchange rate regime (fixed or flexible). In the fourth and last part of this course, the European Monetary System will be analyzed.

Instructors

Koutentakis Franciscos - Apostolakis George - Koukouritakis Minoas

Course Web Page

http://econservices.soc.uoc.gr/econ_classes/course/view.php?id=14

Prerequisites

Sufficient knowledge of Mathematics I (ECO1001) and Macroeconomic Theory I (ECO1002).

Learning Outcomes and General Competencies

On successful completion of the course, the students will be able to:

- Understand how the foreign exchange market works and how exchange rates are determined.
- Understand the balance of payments
- To study the effectiveness of fiscal and monetary policies, related to the existence or not of capital mobility restrictions, and under different exchange rate regimes (fixed or flexible).
- Understand how the EMS works from the Bretton-Woods system to the creation of the EMU and the adoption of the euro as a common currency.

The general skills that the student will acquire upon completion of the course are as follows:

- Decision making.
- Promoting scientific abstraction.
- Promoting inductive thinking.
- Adaptation to new situations.
- Autonomous work.

Assessment method

The assessment is based on a final written evaluation during the regular and re-examination period of the Department of Economics and on the midterm exam.

Tutoring courses	Tutorials are offered during the semester.
Basic textbook	Koutentakis, F. and Koukouritakis, M. (2015). **International Macroeconomics**, Kallipos – Greek Academic Electronic Books and Resources, Athens.
Supplementary material	Blanchard, O (2012). **Macroeconomics (in Greek)**, Epikentro Publishing, Thessaloniki.

Course load per semester (in hours)

Lectures	Tutorials	Individual effort	Total
39	12	149	200

Lectures

- Week 1: Introduction to the Foreign Exchange Markets
- Week 2: Foreign Exchange Market and Interest Parity Conditions
- Week 3: Introduction to the Balance of Payments
- Week 4: Balance of Payments: A Keynesian Approach
- Week 5: Balance of Payments and the Monetary Approach
- Week 6: Macroeconomic Policy in an Open Economy
- Week 7: Midterm Exams
- Week 8: Capital Mobility and Economic Policy Effectiveness
- Week 9: Exchange Rates and Economic Policy Effectiveness
- Week 10: Equilibrium in Fixed and Flexible Exchange Rates (Part A)
- Week 11: Equilibrium in Fixed and Flexible Exchange Rates (Part B)
- Week 12: International Monetary System

Week 13: Refresher Course, Preparation and Guidelines for the Written Exams

MACROECONOMICS III - OIK2004

Course Objectives

The third course in the undergraduate macroeconomics sequence deals, in a thorough way, with advanced issues that are in the core of modern macroeconomic debate regarding the effectiveness of fiscal and monetary policies implemented by the government. The course analyses the Neoclassical approach, as well as market failures which are fundamental for the Keynesian analysis. In particular, the classical model is analysed extensively, in comparison with the Keynesian theories of economic fluctuations. Also, the course provides a brief analysis of the basic model of open economy (Mundell-Fleming). Next, the course focuses on the theoretical models regarding sticky wages, studies the expectations' formation (static, adaptive, rational) and analyses the Lucas critique. The course goes on with the analysis of wealth effects, budget deficits and how they can be financed, as well as the Ricardian equivalence. The course is completed with the study of the modern Neoclassical theory of real business cycles.

Instructors

Koukouritakis Minoas - Giannellis Nikolaos - Koukouritakis Minoas

Course Web Page

http://econservices.soc.uoc.gr/econ_classes/course/view.php?id=18

Prerequisites

The comprehension of Macroeconomic Theory III requires sufficient knowledge of mathematical analysis, as it is covered in Mathematics I (ECO1001) and Mathematics II (ECO1004). In particular, it requires knowledge of differential calculus and integral calculus. It also requires sufficient comprehension of the first two courses of Macroeconomic Theory (ECO1002 and ECO2001).

Learning Outcomes and General Competencies

On successful completion of the course, the students will be able to:

- To comprehend the Classical model, as well as its main differences with the Keynesian theories of economic fluctuations.
- To comprehend the way that an open economy operates.
- To study the theoretical models of sticky wages.
- To understand the issue of dynamic stability, as well as the wealth effects, the ways to finance budget deficits and the Ricardian equivalence.
- To understand the formation of expectations (static, adaptive, rational), as well as the Lucas critique.
- To understand the Neoclassical theory of fluctuations and the real business cycles of an economy.

This course will provide students with an opportunity to develop the general competencies specified below:

- Search, analyze, and synthesize information using the appropriate tools and technologies.
- Decision making.
- Adjustment to new circumstances.
- Critical thinking and problem solving.
- Autonomous essay.

Assessment method

The assessment is based:
(a) On a written exam (in the form of essay type or multiple choice questions) held upon completion of a course at the end of the semester, which counts for the **60%** of the total grade.
(b) On a **mandatory** mid-term written exam (in the form of essay type or multiple choice questions) held upon the 7th week of the course, which counts for the **40%** of the total grade.
On September's resit exam the grade of the mid-term exam still counts for the **40%** of the total grade.

Tutoring courses

The course will include **four (4)** three-hour tutorials, which aim to support students' full comprehension of the teaching material.

Basic textbook

Koukouritakis, M. (2022). **Advanced Macroeconomics: Stability, Expectations and Modern Issues (New revised and updated version)**, Pedio Publishing, Athens (in Greek).

Supplementary material

Romer, D. (2006). **Advanced Macroeconomics**, Typothito Publishing, Athens (in Greek).

Moutos, Th. and Scarth, W.M. (2011). **Modern Economics**, Gutenberg Publishing, Athens (in Greek).

Course load per semester (in hours)

Lectures	Tutorials	Individual effort	Total
39	12	149	200

Lectures

Week 1: The Basic Model of a Closed Economy: Determination of AD and AS

Koukouritakis, Ch. 1, Sec. 1.1-1.3

- Determination of aggregate demand (AD).
- Determination of aggregate supply (AS) via the labour market.
- Aggregate supply with (a) perfect foresight, and (b) adaptive expectations.

Week 2: The Basic Model of a Closed Economy: General Equilibrium

Koukouritakis, Ch. 1, Sec. 1.4-1.5

- General equilibrium with perfect foresight and fully flexible nominal wages.
- General equilibrium with downward nominal wage rigidity.
- General equilibrium with simultaneous nominal wage and price rigidity.

- Schools of Macroeconomic thought.

Week 3: Open Economy I

Koukouritakis, Ch. 2, Sec. 2.1-2.2

- Algebraic presentation of the Mundell-Fleming model.
- Impact effect, stability and complete long-run equilibrium under different exchange rate regimes.
- Derivation of fiscal and monetary multipliers in each case.

Week 4: Open Economy II

Koukouritakis, Ch. 2, Sec. 2.3-2.4

- Public expenditure and exchange rate determination.
- Macroeconomic equilibrium in the Mundell-Fleming model for two open economies.
- Effectiveness of economic policies due to the interdependence of the two countries, either under fixed exchange rates or under flexible exchange rates.

Week 5: Models of Sticky Wages

Koukouritakis, Ch. 3

- Theory of implicit contracts and uncertainty in the model. Equilibrium and conclusions regarding unemployment.
- Theory of efficiency wages. Effort level from workers, equilibrium and effects of several policy variables.
- Labour unions in the labour market.

Week 6: Dynamic Stability Analysis and Economic Policy

Koukouritakis, Ch. 4

- Stability with static expectations: short-run and long-run analysis with (a) endogenous interest rate, and (b) endogenous money supply. Phase diagrams for the determination of stability.
- Stability with adaptive expectations. Phase diagrams for the determination of stability.
- Dynamic stability in the Mundell-Fleming model.
- Exchange rates and expectations. The Dornbusch model and the overshooting of the exchange rate.

Week 7: Mid-term Exam

Week 8: Financing Budget Deficits

Koukouritakis, Ch. 5, Sec. 5.1-5.2

- Money finance of the budget deficit. Stability condition in this case.
- Bond finance of the budget deficit. Stability condition in this case.

Week 9: Debt Sustainability and Ricardian Equivalence

Koukouritakis, Ch. 5, Sec. 5.2-5.3

- Debt sustainability: the case of the Eurozone.
- The meaning of Ricardian equivalence and the dispute about it.

Week 10: Rational Expectations and Effectiveness of the Implemented Economic Policies

Koukouritakis, Ch. 6, Sec. 6.1-6.3

- The meaning of rational expectations and the minimization of the expectational errors from the economic agents of an economy.
- The rational expectations solution in a Neoclassical model and the policy ineffectiveness proposition.

Week 11: Rational Expectations and Time Inconsistency

Koukouritakis, Ch. 6, Sec. 6.4-6.5

- The Lucas critique regarding the use of estimated equations for predicting the anti-monde.
- The problem of time inconsistency (rules vs. discretion). Algebraic and graphic analysis. The issue of credibility of the policy maker.

Week 12: Neoclassical Theory of Fluctuations and Real Business Cycles

Koukouritakis, Ch. 8

- Neoclassical theory of the Real Business Cycles.
- Structure and solution of a model of real business cycles. Intertemporal substitution in labour supply.
- Measuring technological shocks: Solow's residual.
- Public expenditure shock and further extensions.

Week 13: Revision and Preparation for the Final Exam

MICROECONOMICS I - OIK1005

Course Objectives

Microeconomic Theory I is the first course in Microeconomics and is addressed to students in the second semester of their studies. The course is compulsory. The course has two main aims: (a) to introduce students in the principles, methodology and tools of modern microeconomics, and (b) to study the actions and decision making processes followed by the main economic actors: consumers and producers. The course starts by studying how consumers spend their income on the various goods and services produced in the economy. The focus is on how exogenous changes in the prices of goods and services and in income impact on consumers' decisions. The course then turns to study how producers allocate factors of production in order to produce the most profitable combinations of goods and services. The role of technology in producers' decisions is studied. The last part of the course looks at the actions of economic agents under conditions of risk and uncertainty.

Instructors

Nicolitsas Daphne

Course Web Page

http://econservices.soc.uoc.gr/econ_classes/course/view.php?id=12

Prerequisites

The course assumes familiarity with basic economic analysis as taught in Mathematics I (OIK1001) and Mathematics II (OIK1004). More specifically, familiarity with calculus, optimization without and with constraints is a prerequisite. Furthermore, basic concepts from probability theory are necessary in order to understand optimizing behavior under conditions of uncertainty.

Learning Outcomes and General Competencies

Following successful completion of the course, the student will be in a position:

- To understand how the consumer acts: deciding on the optimal allocation of consumer resources among goods.
- To understand how the producer acts: deciding on the optimal allocation of inputs and on the choice of technology.
- To measure consumer and producer surplus.
- To know how consumers and producers react to changes in the economic environment (prices of goods and services, disposable monetary income, economic policies etc).
- To understand the differences between time horizons: short-term and long-term and the importance the amount of information (risk and uncertainty) play in analyzing economic behavior.

The general competences that the student will aquire following successful completion of the course include:

- Understanding of the main economic problem the two main agents (consumers and producers) face.
- Mathematical formulation of the main economic problem and the tools for its solution.
- Measurement of welfare and the impact of economic policy on this.
- An understanding of the role and the importance of the two main parameters of economic activity: time and information.

Assessment method

Assessment of all courses in Microeconomics is based on the final (or resit) exam which accounts for 60\% of the final grade and on a mid-term exam which is compulsory for all students. The two assessments are based on both multiple choice questions and on analytical solutions to problems. The midterm takes place around the 7th week of the semester at a date and time announced at least two weeks in advance. The midterm grade counts for the resit exam too.

Tutoring courses

12 hours tutorials

Basic textbook

Supplementary material

Course load per semester (in hours)

Lectures	Tutorials	Individual effort	Total
39	12	149	200

Lectures

Week 1 - Introduction to Microeconomic Theory

Nicholson, Chapter 1

- The subject and goals of Microeconomic Theory. The role of Microeconomic Theory in modern economics. The distinction between microeconomics and macroeconomics.
- The methodology and tools of microeconomic analysis. The role of economic models and their importance in analyzing consumer and business choices. The principle of optimizing behavior.

Week 2 - Introduction to consumer behavior

Nicholson, Chapter 3; Varian, Chapters 3 & 4; Chacholiades, Chapter 3

- Consumer preferences as determining factors of consumer choices. Properties of consumer choices (completeness, transitivity). Examples of typical preferences.
- Consumer utility function. The concepts of ordinal and cardinal utility. Indifference curve map and consumer choices. Quasi linear and homothetic utility functions.
- The concept of marginal utility. The marginal rate of substitution in the consumption of goods and services. Concave preferences and rate of change of the marginal rate of substitution.
- Goods' prices and the budget constraint. Properties of the set of consumer preferences.

Week 3 - Utility maximization

Nicholson, Chapters 4 & 5; Varian, Chapters 5 & 6; Chacholiades, Chapter 4

- Mathematical formulation of the problem of consumer choice. Marginal rate of substitution and relative prices of goods.
- The concept of demand function and properties of Marshallian demand curves. Aggregate demand curve.
- The indirect utility function of the consumer. Roy's identity.

Week 4 - Comparative static analysis and duality

Nicholson, Chapters 4 & 5; Varian, Chapter 8; Chacholiades, Chapter 4

- The impact on consumer optimizing behavior from changes in the relative price of goods and their disposable income. Price consumption and Engel curves for normal and inferior goods.
- Substitution and income effects for different types of goods. The law of demand. Price and income elasticity of demand. Determining factors of elasticities.
- Minimizing consumer expenditure. The Hicksian demand function. The total expenditure function and its theoretical properties. Shephard's lemma and the Slutsky equation

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Week 5 - Intertemporal consumer choice

Varian, Chapter 10

- The issue of intertemporal choice in consumption. The concept of present value. The role of the interest rate. Consumption and savings in two-period models.
- Intertemporal budget constraint and optimal consumer choices in two period models. The marginal rate of substitution over time.
- Comparative statics. Effects of changes in prices and the interest rate. The nominal and real interest rate. Slutsky equation and intertemporal choices.

Week 6 - Introduction to producer theory

Nicholson, Chapter 7; Varian, Chapter 18; Chacholiades, Chapter 6

- Factors of production, technology of production and outputs. Feasible production sets and their properties. The production possibilities curve. Elasticity of production.
- The production function and the law of diminishing marginal returns. Average and marginal productivity of inputs. Isoquants and the marginal rate of technical substitution between inputs.
- Increasing, decreasing and constant economies of scale. Substitutatibility between factors of production and the elasticity of substitution. Technological progress and its measurement.

Week 7 - Mid-term exam

Week 8 - Costs of production

Nicholson, Chapter 8; Varian, Chapters 20 & 21; Chacholiades, Chapter 7

- The concept of the cost function and its theoretical properties. Economic cost and opportunity costs of the factors of production. Short term and long-term view of cost. \item Minimizing production costs in the short and long-run demand curves for the factors of production. Compensated demand curves for the factors of production. Theoretical properties of the demand functions of inputs.
- The concepts of marginal, average, variable and fixed cost of production. Cost elasticity and economies of scale.

Week 9 - Technical progress

Nicholson, Chapter 8

- Technical progress: determining factors and the impact of technical progress on production. Measuring technical progress. Examples from a number of industries.
- Productivity indices. Hicks-neutral and Hicks-biased technical progress.
- Learning and technical progress. Learning curves. Relationship between production and unit labor cost.

Week 10 - Profit maximization

Nicholson, Chapter 9; Varian, Chapter 19

- Total, average and marginal revenue curves of the firm. The relationship between marginal revenue and elasticity of demand. Compensated demand curves for inputs. The supply curve of the firm.
- The profit function of the firm and its properties. Short-run and long-run analysis. The firm as a price-taker in the product market.
- Profit function and comparative statics. The effect of taxation on output supply and on input demand. Profit maximization for firms that have multiple lines of activity.

Week 11 - Consumer\\\\\\\\\\\\\\\\\\\\\\\\'s surplus and demand curves

Nicholson, Chapter 5; Varian, Chapter 14

- Market equilibrium and social welfare. Producers' surplus and the compensation of factors of production.
- Concept and measurement of consumer surplus. Welfare and compensated and uncompensated demand curves. The concepts of equivalent and compensating income

variation).

Week 12 - Choice under uncertainty

Nicholson, Chapter 18; Varian, Chapter 12

- Decision making under uncertainty. Lotteries and consumer preferences. Von Neumann-Morgenstern utility.
- The concept of risk. Aversion and acceptance of risk. Indices of risk aversion (the Arrow-Pratt approach). Preferences against risk and initial wealth.
- Stochastic dominance of first and second order. Applications in insurance demand and financial investment. Production under uncertainty and profit maximization. Comparative static analysis.

Week 13 - Revision and preparation for final exam

MICROECONOMICS II - OIK2002

Instructors	Skartados Panagiotis - Tzouvelekas Vangelis - Nicolitsas Daphne
Course Web Page	http://econservices.soc.uoc.gr/econ_classes/enrol/index.php?id=15
Basic textbook	
Supplementary material	

Course load per semester (in hours)

Lectures	Tutorials	Individual effort	Total
39	12	149	200

Lectures

MICROECONOMICS III - OIK2005

Instructors	Tzouvelekas Vangelis - Nicolitsas Daphne
Course Web Page	http://econservices.soc.uoc.gr/econ_classes/enrol/index.php?id=19
Basic textbook	
Supplementary material	

Course load per semester (in hours)

Lectures	Tutorials	Individual effort	Total
39	12	149	200

Lectures

ECONOMETRICS I - OIK2003

Course Objectives

The objective of the first unit in the sequence of courses in Econometrics is the in-depth examination of the linear regression model. Using concepts from economic theory, the course examines the theory and practical specification of econometric models that capture the fundamentals of the relations between economic variables. The method of ordinary least squares (OLS) will first be motivated and presented in the context of the simple linear regression model (single explanatory variable), along with methods for statistical inference (hypothesis testing and predicting/forecasting). The basic assumptions behind the simple linear regression model will be presented and discussed and the properties of the OLS estimator derived. Subsequently, the techniques and concepts will be extended to the multiple linear regression model. The interpretation of the parameters of the model and their estimates will be discussed in detail, as well as methods for statistical testing of the validity of hypotheses and for predicting the value of the dependent variable. Finally, the assumptions of the Gauss-Markov theorem will be examined in terms of their intuitive interpretation and the implications for the OLS estimator when these assumptions fail (exact multicollinearity, heteroskedasticity and autocorrelation).

Instructors

Genius Margarita - Emvalomatis Gregory

Course Web Page

http://econservices.soc.uoc.gr/econ_classes/enrol/index.php?id=16

Prerequisites

Sufficient knowledge of concepts from statistics and mathematics, as these are presented in Mathematics I (OIK1001) and II (OIK1004) and in Statistics I (OIK1003) and II (OIK1006) is required for understanding the material presented in the course. Specifically, knowledge and understanding of matrix algebra, random variables and their distributions and statistical inference (hypothesis testing and construction of confidence intervals) is necessary for following the course.

Learning Outcomes and General Competencies

On successful completion of the course, the students will:

- have gained in-depth understanding of the linear regression model and how this can be used for the analysis of economic data
- understand how econometrics combines economic theory, mathematics and statistics for the design, specification, estimation and interpretation of economic relationships using data
- be able to interpret and evaluate empirical studies
- be able to associate the properties of the OLS estimator with the assumptions of the Gauss-Markov theorem
- be able to choose basic tools for hypothesis testing and model selection in the context of linear regression
- be able to discuss and prove the properties of the OLS estimator
- be able to estimate the parameters of linear models using data
- be able to conduct hypothesis tests to examine whether the assumptions of homoskedasticity and non-autocorrelation are satisfied in a linear regression model
- be able to read and comprehend scientific studies and research articles that use the tools

presented in the course
- be able to apply these tools in other courses that involve empirical studies

The general skills that students will have after completion of the course are:
- independent study
- decision making

Assessment method

The assessment is based **exclusively** on a final written examination, which will be timetabled in accordance with the Department's procedure for scheduling of examination periods (February, June, September). The examination includes theoretical questions, quantitative exercises and interpretation of results. Two optional online multiple-choice quizzes will also be administered as formative assessment, but the scores obtained do **not** count towards the final mark.

Tutoring courses

During the semester periods there will be a maximum of five tutorials for the course.

Basic textbook

Supplementary material

Course load per semester (in hours)

Lectures	Tutorials	Individual effort	Total
39	12	149	200

Lectures

Week 1: Introduction to Econometrics

(Χρήστου, Chap. 1; Κάτος, Chap. 1; Τζαβαλής, Chap. 1)

- Econometrics and its goals, economic relations and econometric models
- Types of economic data: cross-sectional, time-series and panel data
- Types of econometric models: linear and non-linear, static and dynamic, single- and multiple-equation models
- Short review of statistics: random variables and their distributions, expected value and variance, hypothesis testing

Week 2: Introduction to the Simple Linear Regression Model

(Χρήστου, Chap. 2; Κάτος, Chap. 3; Τζαβαλής, Chap. 2)

- The simple linear regression model and the concept of ceteris paribus.
- Classical assumptions in the simple linear regression model.
- Ordinary Least Squares (OLS): normal equations, estimation of the model's parameters and properties of the regression line.
- Coefficient of determination (R2) and prediction/forecasting.
- Interpretation of the model's results: ceteris paribus, marginal effects and elasticities.

Week 3: Properties of the Simple Linear Regression Model

(Χρήστου, Chap. 2; Κάτος, Chap. 3; Τζαβαλής, Chap. 2)

- Properties of ordinary least squares (OLS) estimates: unbiasedness, the Gauss-Markov theorem.
- Estimating the variance of the error term and of the least squares (OLS) estimator.

Week 4: Hypothesis Testing in the Simple Linear Regression Model

(Χρήστου, Chap. 2; Κάτος, Chap. 3; Τζαβαλής, Chap. 2)

- Confidence intervals for the model's parameters.
- Hypothesis tests for the model parameters.
- Confidence intervals for the expected value of the dependent variable.
- Confidence intervals for the forecast of the dependent variable.
- The linear regression model without an intercept.

Week 5: Introduction to the Multiple Linear Regression Model

(Χρήστου, Chap. 3; Κάτος, Chap. 4; Τζαβαλής, Chap. 3)

- Using matrices in the multiple linear regression model.
- Classical assumptions in the multiple linear regression model.
- The least squares method in the multiple regression model: the normal equations and estimation of the parameters.

Week 6: Properties of the Multiple Linear Regression Model and Hypothesis Testing I

(Χρήστου, Chap. 3; Κάτος, Chap. 4; Τζαβαλής, Chap. 4-5)

- Interpretation of the estimates of the econometric model (ceteris paribus)
- The coefficient of determination (R2) and the adjusted coefficient of the determination (adjusted R2).

- Unbiasedness of the least squares estimator and the Gauss-Markov theorem.
- The variance-covariance matrix of the least squares estimator.
- Hypothesis testing: testing for a single parameter (the t-statistic)

Week 7: Properties of the Multiple Linear Regression Model and Hypothesis Testing II

(Χρήστου, Chap. 3; Κάτος, Chap. 4; Τζαβαλής, Chap. 4-6)

- Testing linear parameter constraints: the F-staistic.
- Forecasts and confidence intervals of forecasts.
- Properties of the least squares estimator for large samples.

Week 8: Additional Topics in the Multiple Linear Regression Model and Hypothesis Testing

(Χρήστου, Chap. 3, 5; Κάτος, Chap. 5, 8; Τζαβαλής, Chap. 5, 9)

- Changing the units of measurement of the model's variables.
- Model selection criteria: Akaike Information Criterion (AIC), Schwarz Bayesian Criterion (SBC).
- Estimation and interpretation of models with dummy variables.
- Testing for parameter stability (Chow test).

Week 9: Multicollinearity

(Χρήστου, Chap. 6; Κάτος, Chap. 7)

- The problem of multicollinearity in econometric models.
- The effect of multicollinearity on the least squares estimates.
- The variance inflation factor.

Week 10: Heteroskedasticity

(Χρήστου, Chap. 7; Κάτος, Chap. 6; Τζαβαλής, Chap. 7)

- Heteroskedasticity in econometric models.
- Consequences of heteroskedasticity.
- Testing for heteroskedasticity: the Goldfeldt-Quandt, Breusch-Pagan and White tests.
- Estimating the model parameters when the form of heteroskedasticity is known: weighted least squares (WLS), generalized least squares (GLS).
- Estimating the model parameters when the form of heteroskedasticity is unknown: feasible generalized least squares (FGLS).

Week 11: Autocorrelation I

(Χρήστου, Chap. 8; Κάτος, Chap. 6; Τζαβαλής, Chap. 8)

- Autoregressive models AR(p) for the disturbance term: white noise, first-order autoregressive model, properties.
- Consequences of serially correlated errors.
- Testing for serial correlation: residual plots, the Durbin-Watson and Breusch-Godfrey tests.

Week 12: Autocorrelation II: Estimation

(Χρήστου, Chap. 8; Κάτος, Chap. 6; Τζαβαλής, Chap. 8)

- Estimating the linear model when the errors follow an AR(1) model and the value of ρ is known. The Prais-Winsten transformation.
- Estimating the linear model when the errors follow an AR(1) model and the value of ρ is unknown: the Cochrane-Orcutt method.

Week 13: Review and Preparation for the Final Exam

ECONOMETRICS II - OIK2006

Course Objectives

The second course in the undergraduate econometrics sequence focuses on the development of methods to analyze and estimate economic relations when the basic linear model is unsatisfactory. Main topics that will be covered in the second course of the sequence are the problem of error-in-variables, the estimation of models for pooled cross sections (panel data) and of nonlinear models for binary dependent variables, as well as the use of systems of equations when there is simultaneity among the variables.

Instructors

Emvalomatis Gregory - Genius Margarita - Genius Margarita

Course Web Page

http://www.soc.uoc.gr/moodle/course/index.php?categoryid=2

Prerequisites

Sufficient knowledge of basic concepts of statistics and mathematics as taught in Mathematics I (ECO1001) and II (ECO1004), Statistics I (ECO1003) and II (ECO1006), is useful in order to understand the contents of the course. Specifically, the student should be familiar with matrix algebra, statistical inference (confidence intervals, hypothesis testing) and with the concept of random variables and their distributions. In addition, the student should be familiar and understand the material developed in Econometrics I (ECO2003).

Learning Outcomes and General Competencies

On successful completion of the course, the students will be able to:

- Understand the likely problems that can arise in the linear regression model in the presence of stochastic explanatory variables.
- Be able to determine when it is appropriate to estimate a linear model with least squares and when it is not.
- Choose the right estimation method when least squares is not appropriate.
- To understand and evaluate empirical research.
- To choose basic tools to conduct hypothesis tests and model selection.
- To use R for model estimation and hypothesis testing.
- To be able to read and understand studies and research papers that use the tools taught in the course.
- To apply the abovementioned tools in empirical projects for other courses.

Assessment method

The assessment is based on a final exam which takes place according to the normal exam schedule of the department (June and September) and two midterm exams that take place during the semester. The final exam includes both theory and problem solving. The two midterm exams consist of multiple-choice questions. If the average grade of the two midterm exams is bigger than the grade of the final exam then the final grade will be computed as a weighted average of the midterm exams (20%) and final exam grade (80%), otherwise the final grade will be the grade of the final exam. The midterm exams will not be taken into account for the September exam period.

Tutoring courses

During the semester there will be **five (5)** tutorial sessions to help the students better

understand the course material. In addition, practical applications related to estimation of econometric models using the R program will support the course as well as problem solving.

Basic textbook

Supplementary material

Course load per semester (in hours)

Lectures	Tutorials	Individual effort	Total
39	24	137	200

Lectures

Week 1: Measurement Errors in the Variables of the Model

Χρήστου, Ch. 9, Τζαβαλής, Ch. 11, Wooldridge Ch. 15

- Presentation of the problem.
- Measurement error in the dependent variable.
- Measurement error in an explanatory variable.
- Measurement error both in the dependent variable and explanatory variables.
- Consequences of measurement error.

Week 2: Dealing with Measurement Errors and the Method of Instrumental Variables

Χρήστου, Ch. 9, Τζαβαλής, Ch. 11, Wooldridge Ch. 15

- Model estimation in the presence of measurement error: the inverse regression method.
- Model estimation in the presence of measurement error: The Instrumental Variables Estimation Method.

Week 3: Panel Data Models I

Χρήστου, Ch. 25, Wooldridge Ch. 14

- Unobserved effects.
- The fixed effects model.
- The fixed effects estimator.

- The least squares dummy variable regression model.
- Testing for fixed effects.

Week 4: Panel Data Models II

Χρήστου, Ch. 25, Wooldridge Ch. 14

- Time and individual fixed effects in the fixed effects model.
- Fixed effects with unbalanced panels.
- The first difference estimator.

Week 5: Panel Data Models III

Χρήστου, Ch. 26, Wooldridge Ch. 14

- The random effects model.
- Estimation of the model in the presence of individual unobserved effects only.
- Testing for random effects.

Week 6: Binary dependent variable models

Χρήστου, Ch. 12, Τζαβαλής, Ch. 12, Wooldridge Ch. 17

- The logit and probit models.
- Marginal effects.
- Comparing both models.

Week 7: Introduction to Seemingly Unrelated Regressions

Χρήστου, Ch. 14, Τζαβαλής, Ch. 13.

- Seemingly unrelated regression models (SUR models).
- Estimation of SUR models.
- Testing for contemporaneous correlation.

Week 8: Introduction to Simultaneous Equations

Χρήστου, Ch. 16, Τζαβαλής, Ch. 14, Wooldridge Ch. 16

- Introduction to econometric systems of equations.
- Static and dynamic systems.
- Linear and nonlinear systems.
- The structural model, the reduced form and the final form of the model.

Week 9: The Identification Problem in Simultaneous Equation Systems

Χρήστου, Ch. 16, Τζαβαλής, Ch. 14, Wooldridge Ch. 16

- Problem description.
- Identification conditions.

Week 10: Estimation Methods for Systems of Simultaneous Equations

Χρήστου, Ch. 16, Τζαβαλής, Ch. 11, Wooldridge Ch. 15

- The least squares method and its problems.
- The indirect least squares method.
- The two stage least squares method (2SLS).

Week 11: Empirical Applications of Systems of Equations

Χρήστου, Ch. 16, Τζαβαλής, Ch. 14

- Applications to Macroeconomic Models.
- Application to Demand Systems.
- Estimation of profit and cost functions.

Week 12: Empirical Applications of Systems of Equations with R

Χρήστου, Ch. 16, Τζαβαλής, Ch. 14

- R commands.
- Application to macro data using R.

Week 13: Review and Preparation for Final Exam
