Dept of Economics
UNIVERSITY OF CRETE

SYLLABUS OF OTHER BASIC COURSES

ACADEMIC YEAR 2025/2026

Rethymno, 07 October 2025

ENGLISH FOR ECONOMISTS I - OIK1401

Course Objectives

English for Economists 1 is offered as an introductory course which aims at intermediate learners, who already have some knowledge of elementary to intermediate grammar, syntax and vocabulary.
OIK 1401 includes components of terminology, vocabulary, grammar, reading and listening comprehension, besides writing presented in 11 units. The terminology is emphasized in the context of passages relevant with basic economics notions such as “demand and supply”, “utility”, “markets”, “production”, “types of business”, “cost of production and determining factors”, “competition”. Each session focuses on a main passage in which the economics topic is introduced, accompanied by significant vocabulary and concepts.
Grammatical elements include passive voice, conditional sentences, modal verbs, phrasal verbs, comparative forms of adjectives and adverbs, relative clauses, adjective clauses, noun clauses, prepositions, and subject-verb agreement. Vocabulary is taught in context through a thorough analysis of the written material available in the units. The writing component of the course focuses primarily on paragraph development and sheds light on business letter format and style.
The course gives special emphasis to working with numbers, i.e. whole numbers, decimals, percents, fractions, mathematical operations, exponents, etc. Moreover, a variety of exercises discusses data in various forms of graphs and surveys such as line graphs, bar graphs or even pie charts.

Instructors

Papaioannou Jenny

Course Web Page

http://econservices.soc.uoc.gr/econ_classes/enrol/index.php?id=103

Prerequisites

As it is a first-level compulsory English course for university students of economics, participation requires A2 English Language Competency.

Learning Outcomes and General Competencies

The target of the module and its learning outcome for students who systematically participate in this course is to:

- Introduce students and acquaint them with the basic economics terminology.
- Encourage development of strategies essential to understand short English passages in economics.
- Further assess rudimentary grammar and syntax.
- Verify the students’ ability to analyze simple passages and answer questions regarding content and context.
- Assist participants unveil implications.
- Familiarize individuals with the notions of ‘context’, ‘topic sentence’, ‘paragraph unity’, ‘paragraph coherence’.
- Prompt presentation of simple written work.

Upon completion of the course students are expected to be prepared to:

- Materialize group work or pair- work.
- Adopt independent study patterns.
- Utilize communication skills necessary for their progress as economists.

- Communicate fairly in an academic environment.
- Befriend themselves with Business English texts as well as with well-developed paragraph writing.
- Be competent to function as B2 level speakers of English in accordance with the Common European Framework of Languages.

Assessment method

- **Final Examination (100% of the grade - mandatory)**
  The final examination of OIK 1401 is carried out in accordance with the schedule of the examination periods of tertiary education in Greece, i.e. in February, June and September. Assessment is based upon all components taught in class. Therefore, it encompasses some rudimentary terms in economics, vocabulary, reading comprehension, language use, analysis of tables and figures in the form of multiple formulas, gap-filling exercises, transformations or open questions. The former gives a maximum grade of 75% whereas 25% of the grade results from an assessment in writing related to elementary notions in economics.
- **Placement Test (optional in the past years) Exemption from the final examination**
  In the past years freshers used to start with a Placement Test, carried out near the beginning of the fall semester. The date and time was announced sometime in September. First-year students who could successfully cope with the Placement Test, which was a two-hour multiple choice written examination and which incorporated all components of the module, received a grade of 8, 9 or 10 in the course and did not follow the course or take the final examination.
  Evaluation based on the final examination only was obligatory for all students who failed, were discontented with their output in the aforementioned drill or who did not participate in the placement test.

Tutoring courses

Not offered.

Basic textbook

Stefan, J. (2002). **English for Students of Economics: General Economics (2nd edition)**, Gutenberg Publishing, Athens.

Papaioannou, E. (2019). **Notes: Vocabulary, Writing**, Rethymno.

Perdiki, F.K. (2024). **Economic and Business English in a Nutshell**, Athanasios Altintzis Publishing, Athens (in Greek).

Supplementary material

Course load per semester (in hours)	Lectures	Tutorials	Individual effort	Total
	39	0	111	150

Lectures

1st Week: Introduction

- Introduction.
- Revision of important vocabulary elements and intermediate-level grammatical structuresin English.

2nd Week: What is Economics?

Stefan, Unit 1

- Text 1: What Is Economics ?
- Analysing text 1 : vocabulary - context clues - references, comprehension -inference.
- Grammar : irregular verbs, passive voice, modals, prepositions of time.
- Text 2: Travel
- Analysing text 2 : vocabulary - matching information, comprehension -sequencing.
- Application : working with numbers – saying the numbers, dealing with pictures indicatinglists of goods and services.
- Writing: business letter background information.

3rd Week: How Wants Become Demands

Stefan, Unit 2

- Text 1: How Wants Become Demands
- Analysing text 1 : vocabulary, comprehension.
- Grammar : possessive forms, modals, count/non-count nouns, present perfect tense.
- Text 2: Getting to Work
- Analysing text 2 : vocabulary - transportation words, idiomatic expressions.
- Application : working with numbers – decimals and percents.
- Writing: punctuation marks, letters of complaint.

4th Week: Utility

Stefan, Unit 3

- Text 1: Utility
- Analysing text 1 : vocabulary, comprehension.
- Grammar : prepositions, passive voice, close passage, future tense.
- Text 2 : At the Bank
- Analysing text 2 : vocabulary – expressions with numbers, comprehension- discussion atthe bank – placing activities in the right order.

- Application : working with numbers – telling the time.
- Writing: topic sentences.

5th Week: What Is Production?

Stefan, Unit 4

- Text 1: What is Production
- Analysing text 1: vocabulary, comprehension - finding facts.
- Grammar: phrasal verbs, comparing adjectives, relative clauses, subject-verb agreement.
- Text 2: Bank Services
- Analysing text 2: vocabulary, comprehension - situations and services - conversation.
- Application: working with numbers - mathematical operations, understanding graphs.
- Writing: business letter writing.

6th Week: Markets

Stefan, Unit 5

- Text 1: Markets
- Analysing text 1: vocabulary, comprehension - finding the main idea.
- Grammar: irregular verbs, relative clauses, prepositions of place, conditional sentences,close passage.
- Text 2: Supermarkets
- Analysing text 2: vocabulary, comprehension - lists of different services.
- Application: working with numbers - fractions.
- Writing: paragraph writing.

7th Week: Demand and Supply

Stefan, Unit 6

- Text 1: Demand and Supply
- Analysing text 1: vocabulary - context clues - prefixes - economic terms, comprehension - inference.
- Grammar: irregular verbs, double comparisons, noun clauses, phrasal verbs.
- Text 2: Renting an Appartment
- Analysing text 2: vocabulary - telephone calls, comprehension - skimming - sequencing - completion of a conversation.
- Application: working with numbers - review, survey.
- Writing: paragraph writing.

8th Week: Production Costs and Prices

Stefan, Unit 7

- Text 1: Production Costs and Prices
- Analysing text 1: vocabulary - context clues - suffixes - opposites, comprehension exercises.
- Grammar: passive voice, conditional sentences, `Enough', `Would like'.
- Text 2: Eating out
- Analysing text 2: vocabulary, comprehension - preparing the bill - ordering a meal.
- Application: working with numbers - money, story - 'The Cinema or Home'
- Writing: paragraph writing.

9th Week: Factors of Production I

Stefan, Unit 8

- Text 1: Factors of Production 1
- Analysing text 1: vocabulary - references - context clues - suffixes, comprehension -true/ false statements.
- Grammar: passive voice, adverbs of frequency, relative clauses, articles.
- Text 2: Working in a factory
- Analysing text 2: vocabulary, comprehension - matching exercises - writing questions.
- Application: working with numbers - telling the time, graphs about production.
- Writing: paragraph writing.

10th Week: Factors of Production II

Stefan, Unit 9

- Text 1: Factors of Production 2
- Analysing text 1: vocabulary - context clues - noun plurals, comprehension - finding themain idea - expressing opinions.
- Grammar: passive voice, phrasal verbs, noun clauses, conditional sentences.
- Text 2: Robinson Crusoe Invests
- Analysing text 2: answering questions.
- Application: working with numbers - exponents, graph about the production of olive oiland meat in Greece.
- Writing: paragraph.

11th Week: Competition

Stefan, Unit 10

- Text 1: Competition
- Analysing text 1: vocabulary - synonyms - suffixes, comprehension - inference.
- Grammar: prepositions, comparisons of adverbs, passive voice, phrasal verbs.

- Text 2: Like Versus Unlike
- Analysing text 2: vocabulary - preparing oral answers.
- Application: working with numbers - decimals, drill related to the story of RobinsonCrusoe.
- Writing: business letter.

12th Week: Types of Businesses

Stefan, Unit 11

- Text 1: Types of Business Organizations
- Analysing text 1: vocabulary - references - context clues - suffixes, comprehension - findingthe facts.
- Grammar: irregular verbs, `Too and Very', conditional sentences.
- Text 2: The Story of the Levi Strauss Corporation
- Analysing text 2: vocabulary, comprehension.
- Application: working with numbers - decimals, application of the law of supply anddemand.
- Writing: paragraph.

13th Week: Overview

- Overview of the most significant points of the course.
- Preparation for the final examination.

ENGLISH FOR ECONOMISTS II - OIK1402

Course Objectives

The objective of OIK1402 is to prepare students comprehend English passages related to macroeconomics terminology and to utilize knowledge as independent users. The ultimate intent is to indicate certain strategies to the participants for confronting unknown material, while simultaneously teaching specific information that may be useful to them as independent readers of English.
The course is presented during 13 sessions and rotates around essential macroeconomics concepts delineated within 11 units such as 'employment , 'inflation', 'gross domestic product', 'international trade', 'the business cycle', 'money, 'taxation', and 'exchange rates', 'economic integration'.
Each presentation incorporates the commencing sections : (a) Analysis of a passage. (b)Terminology, which consists of a set of terms closely linked to the ideas in the passage. (c) Comprehension, which provides a variety of exercises that refer to the selected notions and vocabulary from the passage. (d) A language use section, in which some of the most frequently found in economics grammaticosyntactic aspects are analysed. (e) Application, that provides the student with the opportunity to make good use of already known material. (f) A writing component as a culminating section, which focuses mainly on paragraph writing, and also exemplifies and progresses to composition and summary writing. A second target of this section is to emphasize a practical approach to scientific writing based on organization, clarity and conciseness.
Presentation, participation and evaluation are focal notions that receive prime attention in this course. Terminology and concepts are presented by means of passages on fundamental macroeconomic issues, taken from university textbooks or similar sources. Supplementary terminology exercises in the Language Laboratory can be used to reinforce new terms and supplement the material taught in class. Terminology used to discuss and describe graphs and tables is also covered. In addition, students are assisted in developing effective strategies to analyse reading material and vocabulary.
Selected elements of language use which commonly occur in scientific reading are taught in a macroeconomics context. Sometimes the students participate in mock exams, in order to familiarise themselves with the actual written tests and the form of the final examination.

Instructors

Papaioannou Jenny

Course Web Page

http://econservices.soc.uoc.gr/econ_classes/enrol/index.php?id=24

Prerequisites

It is presumed that students of this course will already be competent in basic English grammar and vocabulary, and be familiar with general economics terminology as well (English language competence – Level B2). Therefore, material is intented for students who have completed an introductory course in macroeconomics in their native language, as a minimum requirement; hence, they will recognise the corresponding concepts in English.

Learning Outcomes and General Competencies

The learning outcome for participating students in OIK 1402 incorporates the following targets:

- Preparation of students to read and decode English passages related to fundamental macroeconomics terminology necessary for the comprehension and independent reading of macroeconomic passages in English.

- Utilization of certain strategies by the participants for confronting unknown material in a macroeconomic setting, while simultaneously extracting specific information that may be useful in future use of the language.
- Consolidation of frequently used grammatical, syntactic and semantic patterns.
- Teaching writing practices for reproducing effective paragraph, business letter and composition writing in a professional context.
  Upon completion of the course students are expected to:
- Materialize group work or pair- work.
- Be competent in comprehending scientific textbooks and journal articles that make use of macroeconomic concepts.
- Reproduce terminology in assigned academic work.
- Unveil the phrasing and content of life-like material used in a daily business environment.
- Function effectively in a variety of academic and professional settings.
- Reach and attain a C1 level linguistic ability.

Assessment method

- **Final Examination (100% of the grade - mandatory)**
  The final examination of OIK 1402 is carried out in accordance with the schedule of the examination periods of tertiary education in Greece, i.e. in February, June and September. Assessment is based upon all components taught in class. Therefore, it encompasses macroeconomic terminology, vocabulary, reading comprehension, language use, analysis of tables and figures in the form of multiple tasks, gap-filling exercises, transformations or open questions. The former gives a maximum grade of 75% whereas 25% of the grade results from an assessment in writing related to elemental concepts of macroeconomy.
- **Class Assignments (10% of the grade - optional)**
  Partial or marginal evaluation based on class performance requires a number of in-class assignments. These assignments encircle: in-class quizzes or other forms of written exercises based on material that has been taught in class as well as material assigned from authentic sources or other related handouts. Assignments and quizzes must be completed on time, during the session in which they are assigned. There are no make-up quizzes.
  At the end of the semester, students who participate and successfully complete the maximum of in-class tests but one receive a 10% credit in the course. However, evaluation based on the final examination only, a grade of 10 in the course, is required for all students who do not participate in the in-class assignments and written tests.

Tutoring courses

Not offered.

Basic textbook

Stefan, J. (2014). **English for Students of Economics: Macroeconomics (Revised edition)**, Gutenberg Publishing, Athens.

Papaioannou, E. (2019). **Notes: Terminology, Vocabulary, Writing**, Rethymno.

Peppa, I. (2017). **English for Accounting and Business**, Disigma Publishing,

Thessaloniki.

Supplementary material

Course load per semester (in hours)

Lectures	Tutorials	Individual effort	Total
39	0	111	150

Lectures

1st Week: Introduction

- Introduction to Macroeconomics in English.

2nd Week: Macroeconomics

Stefan, Unit 1

- Text: Defining Macroeconomics.
- Related terminology and exercises : average propensity to consume, budget deficit,disposable personal income, investment, MPC, MPS, national income, public debt, public good, time series, resource allocation.
- Comprehension exercises relevant to the selected concepts of the unit.
- Language use section : paired conjunctions, nouns, passive voice.
- Application : discussing trends in a graph, tables of new dwellings constructed in Greece.
- Paragraph writing.

3rd Week: Employment

Stefan, Unit 2

- Text: Types of Employment
- Related terminology and exercises : aggregate demand, cross section data, labor force,labor force participation rate, natural rate of unemployment, cyclical unemployment,disguised unemployment, frictional unemployment, structural unemployment, fullemployment,union, seasonal adjustment.
- Comprehension exercises relevant to the selected concepts of the unit.
- Language use section : close passage, gerunds, modifying adjectives, error analysis.
- Application: graphs showing unemployment rate in Greece.
- Paragraph writing.

4th Week: Inflation

Stefan, Unit 3

- Text: Effects of Inflation
- Related terminology and exercises : aggregate supply, base year, consumer price index,deflation, disinflation, forecasting, cost-push inflation, demand-pull inflation, inflation,inflation-rate, purchasing power of money, quantity theory of money, stagflation, velocityof money.
- Comprehension exercises relevant to the selected concepts of the unit. Fill-in exercise.Word formation.
- Language use section : phrasal verbs, adjective clauses, paired conjunctions.
- Application: graphs showing production of electrical energy in Greece and the Greek CPI.
- Writing: Paragraph writing.

5th Week: Money

Stefan, Unit 4

- Text: What is Money ?
- Related terminology and exercises : asset, bonds, capital market, Central Bank,commercial bank, credit, debit card, demand deposit, discount rate, interest rate, IS-LM model, investment bank, liquidity, monetarism, monetary policy, money market, moneysupply, mutual funds, required reserves, yield.
- Comprehension exercises relevant to the selected concepts of the unit. Affixes.
- Language use section : prepositions, passive voice, conditional sentences.
- Application: Harmonized Long-Term Interest Rates for Convergence Assessment Purposesin Selected Eurozone Countries.
- Writing: Paragraph writing.

6th Week: Gross Domestic Product

Stefan, Unit 5

- Text: What Is Gross Domestic Product ?
- Related terminology and exercises : depreciation, intermediate good, nominal GDP, realGDP, GNP, GDP deflator, NDP, national income accounting, output gap, potential GDP,value-added, value-added tax.
- Comprehension exercises relevant to the selected concepts of the unit.
- Word formation.
- Language use section: phrasal verbs, negative inversion, error analysis.
- Application: article, calculating national product through the expenditures approach.
- Writing: Paragraph.

7th Week: The Business Cycle

Stefan, Unit 6

- Text: The Great Depression of the 1930s
- Related terminology and exercises : acceleration principle, bankruptcy, built-in stabilizers,business cycle, classical economics, countercyclical, depression, fiscal policy, invisiblehand, recession, stabilization policy, stock, stock exchange.
- Comprehension exercises relevant to the selected concepts of the unit. Inference.
- Language use section : adverb clauses, phrasal verbs.
- Application: graph refering to the Dow Jones Industrials Average.
- Writing: Composition outline – 'What are the different kinds of unemployment and whydo they occur ?'

8th Week: Taxation

Stefan, Unit 7

- Text: Fiscal Policy and Taxation
- Related terminology and exercises : ability-to-pay principle, average tax rate, balancesheet, balanced budget, benefit principle, budget surplus, contractionary fiscal policy,expansionary fiscal policy, income tax, liability, marginal tax rate, progressive tax,proportional tax, regressive tax, excise tax, transfer payments.
- Comprehension exercises relevant to the selected concepts of the unit.
- Language use section : infinitives, conditional sentences, adjective-noun forms.
- Application: Diagram indicating Greek tax revenues, and general governmentexpenditures.
- Writing: Compositions.

9th Week: Quantitative Methods

Stefan, Unit 8

- Text: Mathematical Economics – Mathematical versus nonmathematical economics – Mathematical economics versus econometrics
- Related terminology and exercises : bias, complex number, confidence interval, correlationcoefficient, econometrics, definite integral, difference equation, differential equation,exogenous variable, endogenouw variable, goodness-of-fit, regression analysis, standarderror, standardized distribution, statistical tests of hypothesis, stochastic model.
- Comprehension exercises relevant to the selected concepts of the unit.
- Word formation.
- Language use section : close passage, prepositions, paired conjunctions.
- Application: passage – Economists and Mathematicians
- Writing: Compositions.

10th Week: International Trade

Stefan, Unit 9

- Text: Why Do CountriesTrade ?
- Related terminology and exercises : absolute advantage, balance of payments, balance oncurrent account, comparative advantage, conglomerate, developing country, division oflabour, exports, imports, merger, multinational corporation, open economy, opportunitycost, protectionism, terms of trade, trade balance.
- Comprehension exercises relevant to the selected concepts of the unit. Affixes.
- Language use section : phrasal verbs, conditional sentences, adverb clauses.
- Application: tables presenting information about imports and exports in Greece.
- Writing: Summary.

11th Week: Exchange Rates

Stefan, Unit 10

- Text: International Trade and Exchange Rates
- Related terminology and exercises : appreciation of a currency, arbitrage, depreciation of acurrency, devaluation, dumping, fixed exchange rate, flexible (floating) exchange rate,foreign exchange rate, nominal exchange rate, purchasing power parity, quota,realexchange rate, speculation, tariff, trade bloc, World Trade Organization.
- Comprehension exercises relevant to the selected concepts of the unit.
- Word formation.
- Language use section : passive voice, prepositions, adverb clauses.
- Application: Table – Nominal Exchange Rates.
- Writing: Summary.

12th Week: Economic Integration

Stefan, Unit 11

- Text: Economic Integration and the Eurozone Crisis
- Related terminology and exercises : austerity measures, bailout, common market,convergence criteria, customs union, EMU, economic integration, ECB, EFSM, EFSF,ESM, Eurozone, free trade area, monetary union, sovereign debt crisis, structural reforms.
- Comprehension exercises relevant to the selected concepts of the unit. Abbreviations.
- Language use section : phrasal verbs - review, word formation, error analysis.
- Application: table on ‘General Government Debt, 2008-2012’.
- Writing: Compositions.

13th Week: Revision

- Revision of the most significant elements of the course.
- Preparation for the final examination.

COMPUTERS I - OIK1501

Course Objectives

The purpose of the Computer Science courses is to comprehend mathematical calculations and data processing through statistical analysis software in order to familiarize students with the use and correct interpretation of the outputs/results. During the first computer courses an introduction to the application of spreadsheet programs and Wolfram Mathematica Language occur. Later on, students become familiar with the use of commercial and open-source software specialized in Statistical and Econometric Analysis. Theoretical and practical teaching is given with examples adapted to the Economic Science and to specific courses in Statistics and Econometrics offered by the Department. Emphasis is placed on learning simple statistical concepts and hypothesis testing as well as explaining simple and non-linear equations. In addition, students become familiar with general principles of computer operation the use of network collaborating environment, searching for resources on the Internet and bibliography in electronic databases. Calculating Spreadsheets as well as Wolfram Mathematica Language have been one of the main tools in the field of Economics and are used in a variety of statistical and mathematical applications. The course introduces students to the basic concepts of these software and the guidelines for using them. As part of the course, students come in contact with examples of real economic and statistical issues and explore their solution through laboratory exercises. Upon successful completion of the course, students have acquired knowledge of the principles of statistical and mathematical software from a theoretical and practical point of view.

Instructors

Drakos Periklis

Course Web Page

http://econservices.soc.uoc.gr/econ_classes/enrol/index.php?id=3

Learning Outcomes and General Competencies

Upon successful completion of the course, the student will be able to execute the following:

- Capability for using a variety of spreadsheet software (commercial and open source) and understanding their connection with statistics for economics. The student will acquire knowledge of the principles of statistical and mathematical software from a theoretical and practical point of view.
- Ability to describe and interpret results of simple statistical concepts and hypothesis checks.
- Ability to use Matrix calculations, database queries and produce pivot graphics.
- He will be familiar with the general principles of computer operation, the use of networking collaboration, the search for sources on the Internet and literature in electronic databases.
- The general competencies that the student will acquire upon his/her completion course is: Autonomous and Teamwork.

Assessment method

The grading of the course is based on a series of exam options:
1. A mid-term assignment with a reward of 15% of the final grade. The procedure implemented on the moodle online educational platform using the WORKSHOP module. Each student is requested to solve a set of exercises in a time frame of 4-5 days and at the end of the process is evaluated by the instructor but also by five randomly selected fellow

students who also took part in the Intermediate assignment (80% of the grade). At the same time, student must evaluate five random assignments of his/her fellow students (20% of the grade). At the end of the evaluation, the system gives the overall result of the examination. Progress takes place after the 7thweek of lectures.
2. Final exam in the computer lab in real time. During the examination that occurs in the online educational platform moodle (http://economics. soc. uoc. gr/econ_classes/) the student is requested to answer and solve 20 questions and exercises from a pool of more than 100 questions/exercises. The questions answered by each student are chosen in a random way and the order of the answers presented is also random. At the end of the exam, the system gives the result of the exam to the examinee.
3. Exempt work on the entire syllabus. Students are asked to deliver an extensive assignment based on groups of problems given by the instructor. The procedure takes place in the September examination period and is delivered to a digital time slot in eClass. During the delivery of the assignment, students are examined and graded according to the following criteria: (a) Completeness and correctness of the assignment (50%), (b) Structure and presentation of the assignment (20%), (c) Oral examination of a student after the delivery of the assignment (30%). Before the oral exam each student must answer/solve with the use of PC, at least 2 (two) exercises that will be randomly selected from the pronunciation of the exculpatory work. Failure to resolve even one of the exercises may cancel the exculpatory work. In case the exam is successful, the student is exempted from the final exams and the grade of the course is the grade of the assignments in combination with the oral examination.

Tutoring courses

For a better understanding of the course and the assimilation of the material, all lectures and examples are held in the computer laboratory of the School of Social Sciences with the aim that as far as possible, each student to work in a personal computer.

Basic textbook

Supplementary material

Course load per semester (in hours)

Lectures	Tutorials	Individual effort	Total
39	15	96	150

Lectures

Introduction to basic MS-Excel skills for economists

- Simple Calculations with Spreadsheets.
- Formatting cells and tables.
- Creation and format of various Graphs.
- Use Spreadsheets as a database tool.
- Basic statistical functions and tools.

- Introduction to Analysis tools of MS excel.
- Compute Confidence Intervals of mean.
- Hypothesis testing, Distribution Z and t-student.
- Matrix algebra with Spreadsheets.

Introduction to MATHEMATICA

- The window of Mathematica, Simple arithmetic operations.
- Mathematical functions, using help (Help).
- Mathematical constants, definition of variables and use of previous results.
- Algebraic calculations and Limits.
- Calculation of integrals, Derivatives, Sums and Products.
- Solve equations, define functions.
- Matrix algebra.
- Systems of equations and charting.

COMPUTERS II - OIK2501

Course Objectives

The purpose of the Computer Science courses is to understand mathematical calculations and data processing through statistical analysis software in order to familiarize students with the use and correct interpretation of the outputs/results. During the first computer courses an introduction to the application of spreadsheet programs and Wolfram Mathematica Language occur. later, students become familiar with the use of commercial and open-source software specialized in Statistical and Econometric Analysis. Theoretical and practical teaching is given with examples adapted to the Economic Science and to specific courses in Statistics and Econometrics offered by the Department. Emphasis is placed on learning simple statistical concepts and hypothesis testing as well as explaining simple and non-linear equations. In addition, students become familiar with general principles of computer operation the use of network collaborating environment, searching for resources on the Internet and bibliography in electronic databases.
Students become familiar with the use of two well-known commercial software of statistic and econometric analysis but also with the corresponding software offered by the free software community. At the same time, theoretical and practical teaching takes place with examples adapted to economics and the courses offered by the department. The modules taught in each program are summarized below:
SPSS -PSPP/(SPSS Clone). Definition of variables (nominal, ordinal, scale), Transformations of variables, recoding of values, management of missing values, Tables of frequencies & percentages, creation and formatting of graphs, descriptive statistics, correlation of variables, linear regression , non-regression estimation linear equations, selection of samples (random selection, filters), Statistical hypothesis checks.
EViews/Gretl. Creation of time series by entering data, importing time series from spreadsheets, transforming time series, presenting, and formatting diagrams, creating groups and presenting data in tables, simple linear regression, multiple linear regression, applying real model solving, dealing with econometric problems, solving nonlinear functions.

Instructors

Drakos Periklis

Course Web Page

http://econservices.soc.uoc.gr/econ_classes/enrol/index.php?id=4

Prerequisites

Learning Outcomes and General Competencies

Upon successful completion of the course, the student will be able to perform the following:

- Use of statistical analysis software (commercial and open source) in order to tackle with problems related to statistics, econometrics with quantitative and qualitative data.
- Ability to comprehend the principles of statistical and econometric software from a theoretical and practical point of view.
- Ability to describe and interpret results of statistical concepts, hypothesis tests and econometric problems.
- Ability to solve simple and nonlinear equations as well as produce related graphics.
- Ability to analyze and correct through software, econometric problems and problems stemming from the nature of the data.

- Ability to draw up, codify and analyse a questionnaire for quantitative and qualitative research.
- Capability for promotion of free, creative and inductive thinking.

Assessment method

The grading of the course is based on a series of exam options:
1. A mid-term assignment with a reward of 15% of the final grade. The procedure implemented on the moodle online educational platform using the WORKSHOP module. Each student is requested to solve a set of exercises in a time frame of 4-5 days and at the end of the process is evaluated by the instructor but also by five randomly selected fellow students who also took part in the Intermediate assignment (80% of the grade). At the same time, student must evaluate five random assignments of his/her fellow students (20% of the grade). At the end of the evaluation, the system gives the overall result of the examination. Progress takes place after the 7thweek of lectures.
2. Final exam in the computer lab in real time. During the examination that occurs in the online educational platform moodle (http://economics. soc. uoc. gr/econ_classes/) the student is requested to answer and solve 20 questions and exercises from a pool of more than 100 questions/exercises. The questions answered by each student are chosen in a random way and the order of the answers presented is also random. At the end of the exam, the system gives the result of the exam to the examinee.
3. Exempt work on the entire syllabus. Students are asked to deliver an extensive assignment based on groups of problems given by the instructor. The procedure takes place in the September examination period and is delivered to a digital time slot in eClass. During the delivery of the assignment, students are examined and graded according to the following criteria: (a) Completeness and correctness of the assignment (50%), (b) Structure and presentation of the assignment (20%), (c) Oral examination of a student after the delivery of the assignment (30%). Before the oral exam each student must answer/solve with the use of PC, at least 2 (two) exercises that will be randomly selected from the pronunciation of the exculpatory work. Failure to resolve even one of the exercises may cancel the exculpatory work. In case the exam is successful, the student is exempted from the final exams and the grade of the course is the grade of the assignments in combination with the oral examination.

Tutoring courses

For a better understanding of the course and the assimilation of the material, all lectures and examples are held in the computer laboratory of the School of Social Sciences with the aim that as far as possible, each student to work in a personal computer.

Basic textbook

Supplementary material

Course load per semester (in hours)	Lectures	Tutorials	Individual effort	Total
	39	15	96	150

Lectures

Introduction to SPSS (PSPP) and use for Social Sciences

- Introduction to PSPP (SPSS clone} - Similarities and differences with SPSS - Presentation of statistical packages SPSS - Eviews - Gretl (similarities - differences). Types and functions of variables.
- Variable and Data Handling Techniques in SPSS I
  - Sampling. Random samples. Data handling. Selection of sample parts. Transform variables. Techniques for handling multiple data files.
- Variable and Data Handling Techniques in SPSS II - Descriptive Statistics
  - Case options, recoding, calculation of new variables. Concatenation and splitting of files, Calculate results into groups. Descriptive Statistics with SPSS. Ready-made functions and graphics.
- Statistical Data Analysis in SPSS
  - Calculation of new variables, Descriptive statistics II. Median hypothesis tests, Normality tests. Descriptive statistics and distributions with graphs.
- Correlations of Variables I
  - Statistical tests using cross-tabulation. Techniques for handling multiple response sets. Statistical test of chi-squared distribution.
- Correlations of Variables II
  - Analysis of Variance (one factor). Related graphs. Simple linear regression.
- Multiple linear regression (with cases of selection parts from the dataset).

Introduction to EVIEWS (econometrics)

- Data Processing and Descriptive Statistics in Eviews I
- Import data from external files. Data processing and data edit.
- Descriptive statistics using Eviews II.
  - Operations, Transformations and Storage of Variables
- Statistical Hypothesis tests in EVIEWS
  - Using GENR /SERIES command
  - FETCH / STORE command capabilities. DATED DATA TABLES option. Moving average (usage and utility).
- Calculations and Operations in Eviews
  - First differences of logarithms. Table operations in Eviews.
  - Estimation of risk factors in stock market data.
- Multiple Regression in Eviews I
  - Solving problems derived from data. Linear model correction.
  - Interpreting results, constructing graphs.
- Multiple Regression in Eviews II
  - Identification of econometric problems. Correction of econometric problems. Interpretation of results.

INTRODUCTION TO PROGRAMMING LANGUAGES - OIK2502

Course Objectives

The course introduces students to the fundamental principles of programming with the use of the programming languages Python and R. The primary objective of the course is to familiarize students with the approaches to solving simple problems that are amenable to automation. Python is a popular, modern general programming language, which can be used, among others, to develop applications, to solve mathematical problems, to analyze data and to create web pages. R concentrates on statistical analysis and scientific computing and it is popular among economist, while its knowledge is a prerequisite in many job openings relevant to economists. Examples of problems that will be analyzed in the course are collection of user data, automatic compilation and sending of personalized emails, statistical analysis and visualization of data and analysis of mathematical problems through the application of simple algorithms. The course is applied in nature, but includes many references to the theoretical underpinnings of computations and algorithms, emphasizing the approach taken to solving a problem.

Instructors

Emvalomatis Gregory

Course Web Page

https://econservices.soc.uoc.gr/econ_classes/course/view.php?id=439

Prerequisites

Knowledge of basic principles of computer operation, as these are taught in Computers I (OIK1501), is necessary for following the course. Also, the course will use, after a short revision, some concepts covered in Mathematics I (OIK1001) and Statistics I and II (OIK1003 and OIK1006), as these are taught by the Department of Economics.

Learning Outcomes and General Competencies

After successful completion of the course students will be able to:

- Classify the most popular programming languages based on their attributes and chose these appropriate for solving specific problems.
- Analyze complex problems to their components and solve them using the programming languages Python and R.
- Apply modern programming frameworks and practices for the solution of new problems.

The general skills that students will have after completion of the course are:

- Solution of applied problems that are amenable to automation through programming .
- Abstract and algorithmic thinking.
- Understanding of the capabilities and limits of process automation.
- Both autonomous, as well as teamwork.

Assessment method

The final mark for the course is determined by elements of continuous and summative assessment. Students are expected to attend the computer labs and, at the end of each lab, to present functioning code that solves the respective problem. Out of the 9 computer labs that are associated with assignments, students must be able to solve at least 7, so that they get 10% of the final mark (if they fail to do so, they lose this 10% entirely). Two short, multiple-choice quizzes will take place during the computer labs, each one having a weight of 10% on the final mark. The dates of quizzes will be announced during the lectures, as

well as on the course's website, at least one week prior to the quiz. The final exam for the course has a weight if 70% on the final mark and it will be administered in a computer lab. It will include short-response, open-ended questions and solving problems with the use of Python and R. The quiz and computer-lab marks **will continue to weight** on the final mark in the September resit exam.

Tutoring courses

During the semester, **nine (9)** computer lab sessions are held to enhance students' understanding and assimilation of the material. In these labs, students solve applied problems using the Python and R programming languages.

Basic textbook

Deitel, H.M. and Deitel, P.J. (2021). **Εισαγωγή στην Python για τις Επιστήμες Υπολογιστών και Δεδομένων**, Εκδόσεις Γκιούρδα & ΣΙΑ ΕΕ,

Supplementary material

Guttag, J.V. (2022). **Εισαγωγή στον Υπολογισμό και τον Προγραμματισμό με την Python (3η έκδοση)**, Εκδόσεις Παπασωτηρίου,

Πανέτσος, Σ. (2019). **Εισαγωγή στον Προγραμματισμό Υπολογιστών με την Python**, Εκδόσεις Τζιόλα,

Αβούρης, Ν., Κουκιάς, Μ., Παλιουράς, Β. και Σγάρμπας, Κ. (2018). **Python – Εισαγωγή στους Υπολογιστές (4η έκδοση)**, ΙΤΕ - Πανεπιστημιακές Εκδόσεις Κρήτης,

Σαμαράς, Ν. και Τσιπλίδης Κ. (2019). **Το Βιβλίο της Python**, Εκδόσεις Κριτική,

Course load per semester (in hours)

Lectures	Tutorials	Individual effort	Total
23	16	111	150

Lectures

1st Week: Introduction and fundamental concepts

Deitel, H. M. and P. J. Deitel. (2021), Chap. 1, Guttag, J. V. (2022), Chap. 1

- Introduction to the course.
- An automation problem (sending personalized emails) and the approach to solving it.
- Programming languages and algorithms.
- Classification of programming languages:

1. interpreted and compiled

2. procedural, object oriented, functional and markup
3. general and domain specific

- Why Python and R?

2nd Week: Introduction to Python

Deitel, H. M. and P. J. Deitel. (2021), Chap. 1, 2, 5 &6, Guttag, J. V. (2022), Chap. 2

- Installation and development environments (IDLE, PyCharm and Jupyter).
- Input and output – the print and input functions.
- Accessing the operating system's command line from Python.
- Basic data structures in Python.

1. numbers – types and resource requirements
2. strings
3. booleans
4. tuples, lists and dictionaries

- Variables and assignment.
- Application: asking for user input and printing messages on the screen.

3rd Week: Program flow I – Conditionals and loops

Deitel, H. M. and P. J. Deitel. (2021), Chap. 2 & 3, Guttag, J. V. (2022), Chap. 2 & 3

- Conditional execution and the if-else expression.
- Conditional execution and the match-case expression.
- Boolean operators.
- The for loop.
- The while Loop.
- The break and continue commands.
- Application: determining the rank of a matrix using Gaussian elimination.

4th Week: Program Flow II – Functions

Deitel, H. M. and P. J. Deitel. (2021), Chap. 4, Guttag, J. V. (2022), Chap. 4

- Defining and calling a function.
- Parameters and return values of a function.
- Organizing code in multiple files.
- Application: is the matrix symmetric?

5th Week: Packages in Python I – Matrix algebra with NumPy

Deitel, H. M. and P. J. Deitel. (2021), Chap. 7

- General introduction to packages in Python.
- Defining matrices and vectors in NumPy.
- Basic operations in matrix algebra.
- Reading data into Python.
- Transforming data.
- Application: solving a linear system of equations.

6th Week: Packages in Python II – Statistical data analysis with statsmodels

Deitel, H. M. and P. J. Deitel. (2021), Chap. 7, Guttag, J. V. (2022), Chap. 23

- Overview of data.
- Summary statistics.
- Hypothesis testing using the t statistic.
- Application: is the growth rate of Bitcoin's price positive?

7th Week: Packages in Python III – Statistical data analysis with pandas and SciPy

Deitel, H. M. and P. J. Deitel. (2021), Chap. 7, Guttag, J. V. (2022), Chap. 23

- Double-entry tables and testing for correlation with the $\chi 2$ statistic.
- Linear regression with pandas.
- Estimation of the parameters of a linear regression model using matrix algebra.
- Application: are the Bitcoin and Etherium prices correlated?

8th Week: Packages in Python IV – Plots with Matplotlib

Guttag, J. V. (2022), Chap. 13, Notes/Lecture slides

- Plotting mathematical functions.
- Visualizing data: pie charts, bar charts, scatter plots.
- Adjusting the plot attributes (size, colors, titles, etc.).
- Application: plotting the results of a linear regression model.

9th Week: Debugging, profiling and organization of code

Deitel, H. M. and P. J. Deitel. (2021), Chap. 9, Guttag, J. V. (2022), Chap. 8 & 9, Notes/Lecture slides

- Comments in code.
- Exceptions and the try-except expression.
- Which part of the code is taking time to execute?
- Applications with many files and creating our own packages in Python.

10th Week: Introduction to R

Notes/Lecture slides

- Installation and development environment (RStudio).
- Basic data structures in R:

1. numbers
2. strings
3. lists and collections
4. dataframes and matrices

- Conditional execution and loops.
- Functions.
- Application: function for finding the roots of a 2nd degree polynomial.

11th Week: Data analysis in R

Notes/Lecture slides

- Reading data into R and summary statistics.
- Plotting.
- Estimation of the parameters of a linear regression model.
- Packages in R.
- Application: are the prices of Bitcoin and Etherium correlated?

12th Week: Programming languages and the Internet

Notes/Lecture slides

- HTML and the Internet – why HTML today;
- Cascading Style Sheets – CSS.
- Dynamic web pages: purpose and capabilities of javascript and PHP.
- WebAssembly: the future of the Internet;
- Application: creating a personal web page.

13th Week: Revision and preparation for the final exam