

## SYLLABUS

### 1. General

<b>College</b>	College of Applied Economics and Social Sciences		
<b>Department</b>	Regional and Economic Development		
<b>Level of Studies</b>	Undergraduate		
<b>Couse Code</b>	ΠΟΑ6424	<b>Semester</b>	4o
<b>Course Title</b>	Econometry 1		
<b>Faculty Name</b>	PANAGIOTIS PANAGIOTOPOULOS		
<b>INDEPENDENT TEACHING ACTIVITIES</b> where credit is awarded for discrete parts of the course e.g. lectures, laboratory exercises, etc. If credit is awarded for the whole course, indicate the weekly teaching hours and the total number of credits		<b>WEEKLY CONTACT HOURS</b>	<b>ECTS</b>
		5	5
<b>COURSE TYPE</b> Background, General Knowledge, Scientific Area, Skills Development	Scientific area		
<b>Prerequisites</b>	-		
<b>Language of instruction and examinations</b>	Greek		
<b>Course Offered to Erasmus Students</b>	No		
<b>Course Webpage</b>	<a href="https://oeclass.aua.gr/eclass/">https://oeclass.aua.gr/eclass/</a>		

## 2. COURSE LEARNING OUTCOMES

### Learning Outcomes

- The learning outcomes of the course describe the specific knowledge, skills and competences of an appropriate level that students will acquire after successful completion of the course.

#### Knowledge:

- Understand the concept and nature of an econometric model and the difference from an economic model and define concepts such as residuals, estimator, estimation method
- Know the steps for constructing an econometric model
- Know, formulate and analyze an econometric model, the assumptions and properties of estimation methods of an econometric model
- To know how to interpret and evaluate an econometric model based on the economic question posed, the nature of the variables and the available data.
- For students to understand the nature of regression analysis and to be able to interpret bivariate and multivariate analysis results.
- To propose solutions to correct problems presented by the respective data, having as consequence of violating the assumptions of the normal linear model.
- To be aware of the problems of multicollinearity, heteroscedasticity and autocorrelation.
- To know basic routines and regression tools in Excel as well as their interpretation.

#### Abilities (be able to):

- Understand and apply diagnostic tools for residue control.
- Understand and apply the normal linear regression model, make hypothesis tests and predictions.
- Construct a normal linear regression model, state the assumptions and prove the properties of the estimators.
- Interpret and analyze an econometric model and conduct hypothesis tests and predictions (statistical induction).
- Propose solutions to correct problems presented by the respective data and which have the consequence of violating the assumptions of the normal linear model.
- Solve the problems of multicollinearity, heteroscedasticity and autocorrelation.
- Use Excel to estimate an econometric model.

#### Skills:

- To empirically answer an economic question by constructing, estimating, interpreting, and evaluating an econometric model and conducting statistical tests and predictions.

### **General skills**

*Taking into account the general competences that the graduate should have acquired (as listed in the Diploma Supplement and listed below), which one(s) does the course aim at?*

*Search, analysis and synthesis of data and information, including the use of the necessary technologies*

*Adaptation to new situations*

*Project planning and management*

*Respect for diversity and multiculturalism*

*Respect for the natural environment*

<i>Decision-making</i> <i>Autonomous work</i> <i>Group work</i> <i>Working in an international environment</i> <i>Working in an interdisciplinary environment</i> <i>Generating new research ideas</i>	<i>Demonstrating social, professional and ethical responsibility and gender sensitivity</i> <i>Exercise of criticism and self-criticism</i> <i>Promotion of free, creative and deductive thinking</i>
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After completing the course:

Students will be able to understand, to analyze have opinions concerning real issues related to problems of economic nature.

They will have developed their critical ability to make decisions after analyzing the data, using the necessary technologies.

They will have the ability to work independently and manage projects.

### 3. COURSE CONTENT

Regression analysis, Bivariate and multivariate regression analysis. Assumptions of the normal, classical linear model, Induction and problems, Multicollinearity, Heteroscedasticity, Autocorrelation, Nonlinear models, Qualitative response models, Panel data and time series models, Simultaneous equation models and methods, Forecasting

1. Subject of Econometrics
  - Purpose and objectives of econometrics
  - Basic stages of econometric analysis
  - Differentiation of econometric models
  - Steps to solve an econometric problem
2. The Bivariate Linear Model
  - Basic assumptions
  - Regression line
  - Simple form of the method of least squares (OLS)
  - Flexibility and change in the units of measurement of the variables
3. The Multivariate Linear Model
  - Basic assumptions
  - Least squares estimators
  - Properties of the estimators given by the OLS method
  - Maximum likelihood estimators
4. The Multivariate Linear Model (cont.)
  - Estimation of the constant variance of the homoskedastic disturbance terms
  - Statistical characteristics of the dependent variable and the various estimators
  - Estimation of the mean elasticity in the multivariate model
5. Hypothesis testing
  - General case
  - Hypothesis tests with t and F statistics
  - Significance tests of one factor, all the factors simultaneously and a group of them
  - Analysis of variance
6. Hypothesis testing (cont.)
  - Coefficient of determination
  - Correlation coefficient
  - Regression coefficients and elasticity
  - Confidence intervals
7. Predictions
8. Special form interpretive variables

<ul style="list-style-type: none"> <li>• Time trend variables</li> <li>• Pseudo-variables</li> <li>• Determining the change in function using dummy variables</li> </ul>
9. <u>Multicollinearity</u> <ul style="list-style-type: none"> <li>• Full and partial multicollinearity</li> <li>• Consequences of ignoring multicollinearity</li> <li>• Criteria for establishing multicollinearity</li> <li>• Ways to deal with multicollinearity</li> </ul>
10. <u>Heteroscedasticity</u> <ul style="list-style-type: none"> <li>• Basic reasons that can cause heteroscedasticity</li> <li>• Consequences of ignoring heteroscedasticity</li> <li>• Checks for heteroscedasticity</li> <li>• Heteroscedasticity and weighted least squares estimation</li> <li>• Ways to deal with heteroscedasticity</li> <li>• Autoregressive heteroscedasticity (ARCH, GARCH)</li> </ul>
11. <u>Autocorrelation</u> <ul style="list-style-type: none"> <li>• Key reasons that can cause autocorrelation</li> <li>• Consequences of ignoring autocorrelation</li> <li>• Autocorrelation and feasible least squares estimators</li> <li>• Tests for establishing first-order autocorrelation</li> <li>• Tests for establishing autocorrelation of any order</li> <li>• Model estimation when autocorrelation is present</li> </ul>
12. <u>Regression Models with Dummies</u>
13. <u>Repetition and recapitulation</u>

#### 4. TEACHING AND LEARNING METHODS - ASSESSMENT

<b>METHOD OF DELIVERY</b> Face-to-face, Distance learning, etc.	Lectures and meetings with students	
<b>USE OF TECHNOLOGY, INFORMATION AND COMMUNICATION</b> <i>Use of ICT in teaching, laboratory training, communication with students</i>	Computer and interactive whiteboards will be used in teaching. Presentations using Power point. Communication with students will be done on a personal level, also using e-mail and direct communication (e.g. skype)	
<b>ORGANISATION OF TEACHING</b> <i>The way and methods of teaching are described in detail.</i> Lectures, Seminars, Laboratory Exercise, Field Exercise, Study & Analysis of Literature, Tutorials, Practical (Placement), Clinical Exercise, Artistic Workshop, Interactive teaching, Educational visits, Study visits, Project work, Writing of work / assignments, Artistic creation, etc.  <i>The student's study hours for each learning activity as well as the hours of unguided study are indicated so that the total workload at semester level corresponds to the ECTS standards.</i>	<b>Activity</b>	<b>Workload</b>
	Lectures	65 hours
	Study of course material (material taught)	27 hours
	Exercises and practice of in economic applications	33 hours
	Course Total	125 hours
<b>STUDENT ASSESSMENT</b> <i>Description of the evaluation process</i>	Written Final Exams at the end of the semester and tentative midterm examinations during the course.	

<p><i>Language of Assessment, Assessment Methods, Formative or Inferential, Multiple Choice Test, Short Answer Questions, Test Development Questions, Problem Solving, Written Work, Report, Oral Examination, Oral Examination, Public Presentation, Laboratory Work, Clinical Examination of a Patient, Artistic Interpretation, Other</i></p> <p><i>Explicitly identified assessment criteria are stated and if and where they are accessible to students.</i></p>	<p>Work on real data using excel.</p>
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## 5. BIBLIOGRAPHY

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