**SYLLABUS**

1. **General**

|  |  |
| --- | --- |
| **School** | Applied Economic and Social Sciences |
| **Department** | Regional and Economic Development |
| **Level of Studies** | Undergraduate |
| **Couse Code** | **6209** | **Semester** | 2 |
| **Course Title** | Statistics II |
| **Faculty Name** |  |
| **Office Hours** |  |
| **email** |  |
| **INDEPENDENT TEACHING ACTIVITIES** *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* | **WEEKLY CONTACT HOURS** | **ECTS** |
|  | 4 | 6 |
|  |  |  |
|  |  |  |
|  |  |  |
| **COURSE TYPE****Background, General Knowledge, Scientific Area, Skills Development** | **Background** |
| **Prerequisites** | - |
| **Language of instruction and examinations** | Greek |
| **Course Offered to Erasmus Students** | No |
| **Course Webpage** | https://oeclass.aua.gr/eclass/ |

1. **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.*
 |
| By successfully attending the course, students:* understand basic concepts of Statistics
* can use statistical tests on real problems
* know basic distributions and become familiar with random variables.
* have the necessary training and critical skills to recognize the appropriate statistical methods depending on the nature of the research problem
* acquire scientific critical thinking, utilize knowledge and apply the methodological tools presented during the course to solve future problems
 |
| ***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* ***Decision-making*** ***Autonomous work*** ***Group work*** *Working in an international environment* *Working in an interdisciplinary environment* *Generating new research ideas* | *Project planning and management* *Respect for diversity and multiculturalism* *Respect for the natural environment* *Demonstrating social, professional and ethical responsibility and gender sensitivity* *Exercise of criticism and self-criticism* ***Promotion of free, creative and deductive thinking*** |
|  |

1. **COURSE CONTENT**

|  |  |
| --- | --- |
| **1st Lecture****Introduction** | * Review of basic probability concepts and connect probability to statistics
 |
| **2nd – 4th Lecture** **Descriptive statistics** | * Quantitative variables
	+ Construction of a frequency (distribution) table
	+ Graphical presentation of frequency distribution
	+ Numerical descriptive measures
	+ Position measures
	+ Measures of dispersion
	+ Measures of skewness and measures of kurtosis
* Qualitative variables
* Address and direction variables
* Graphical presentation of frequency distribution of circular data
* Numerical descriptive measures of circular data

*Chapter 9 of the core coursebook* |
| **5th – 7th Lecture** **Statistical functions and Sampling distributions** | * Basic concepts
* Basic sampling distributions
* Estimating functions and estimation methods
* Point and confidence interval estimation - Properties of estimators
* Confidence interval for population mean
* Confidence interval for the binomial rate
* Confidence interval for the variance of a normal population
* Confidence Interval for the Difference of Two Population Means (Independent and Dependent Samples)
* Confidence interval for the difference of two binomial proportions with two independent samples
* Confidence interval for the ratio of the variances of two normal populations
* Upper and lower bound of confidence interval

*Chapters 10 & 11 of the core coursebook* |
| **8th – 10th Lecture** **Statistical hypothesis testing** | * Basic concepts
* Statistical hypothesis testing about the mean of a population (normal population, large sample size,)
* Type II error probability and power of a statistical control
* Statistical hypothesis testing for binomial rate
* Statistical hypothesis testing for the variance of a normal population
* Statistical hypothesis testing for the difference in the means of two populations (independent and dependent samples)
* Statistical hypothesis testing for the difference of two binomial proportions with two independent samples
* Statistical Hypothesis Testing for Equality of Variances of Two Normal Populations Basic Discrete Distributions

*Chapter 12 of the core coursebook* |
| **11th – 12th Lecture** **Analysing variance** | * Completely Randomized Design
	+ (1 – a)100% Confidence Intervals for mean of one operation and for difference of means of two operations
	+ Multiple comparison tests
	+ Assumptions/assumptions in a completely randomized design
* Randomized Complete Group Design
	+ Multiple comparison tests
	+ Assumptions/assumptions
* a X b Factorial Experiment
	+ Multiple comparison tests
	+ Interaction diagram
	+ Assumptions/assumptions in a X b factorial experiment with r > 1 observations per intervention

*Chapter 13 of the core coursebook* |
| **13th Lecture****x 2 test** | * test x 2 with and without unknown parameters
* Control x 2 independence
* Check x 2 for homogeneity

*Chapter 14 of the core coursebook* |

1. **TEACHING AND LEARNING METHODS - ASSESSMENT**

|  |  |
| --- | --- |
| **METHOD OF DELIVERY****Face-to-face, Distance learning, etc.** | Lectures and meetings with students Deliveries take place in the form of face-to-face lectures.In order to better consolidate the teaching content, interactive teaching is carried out with questions and answers. In addition, in each lecture, the presentation of the topics will be accompanied by relevant examples and applications of statistical methodologies in matters related to business, economics and regional economy and development. |
| **USE OF TECHNOLOGY, INFORMATION AND COMMUNICATION***Use of ICT in teaching, laboratory training, communication with students* | Computer, projector and interactive whiteboard will be used in the teaching. Communication with students will be on a personal level, also using e-mail and direct telecommunication (e.g. skype). Learning process support through the AUA Open eClass platform. |
| **ORGANISATION OF TEACHING***The way and methods of teaching are described in detail.**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.**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.* |

|  |  |
| --- | --- |
| ***Activity*** | ***Workload*** |
| Lectures | 52 hours |
| Study of course material (material taught) | 52 hours |
| Exercises and practice of in economic applications | 21 hours |
|  |  |
|  |  |
| Course Total | 125 hours |

 |
| **STUDENT ASSESSMENT** *Description of the evaluation process**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**Explicitly identified assessment criteria are stated and if and where they are accessible to students.* | Written Final Exams and exercises during the course

|  |  |
| --- | --- |
| Final exams |  |
| Mandatory Final Exam:All matter | 100% |

 |

1. **BIBLIOGRAPHY**

|  |
| --- |
| **Main Textbooks (all in Greek):*** **Papadopoulos, G.K. (2015). Introduction to Probability and Statistics. Gutenberg Publications. BASIC COURSE MANUAL**
* Walpole, RE, Myers, RH, Myers, SL, Ye, K (2019). Statistics and Probability. Tsakanikas Angelos (editor), published by Tziolas, 9th Edition.
* Berenson, LM, Levine, MD, Szabat, AK (2018). Fundamentals of Statistics for Business – Concepts and Applications. Broken Hill Publishers Ltd
* Aczel, A (2011). Statistical Thinking in the Business World, Broken Hill Publishers LTD, 1st edn
* Anderson, D., et al. (2013). Statistics for Business & Economics. Cengage Learning.
 |