SCHOOL OF INFORMATION SCIENCES AND TECHNOLOGY

DEPARTMENT OF STATISTICS

MSc. in APPLIED STATISTICS

STUDY GUIDE
ATHENS, ACADEMIC YEAR 2022-23

PART I: INFORMATION ABOUT THE INSTITUTION

CONTACT DETAILS (Name & Address)

ATHENS UNIVERSITY OF ECONOMICS AND BUSINESS (AUEB)

Address:76, Patission Str. GR-10434, Athens

Telephone number: +30-210-8203911

Website: https://www.aueb.gr

e-mail: webmaster@aueb.gr

Facebook: https://www.facebook.com/auebgreece

Twitter: https://twitter.com/aueb

Linkedin: https://www.linkedin.com/school/athens-university-of-economics-and-business/mycompany/

Youtube: https://www.youtube.com/channel/UCPncunqp3bMuAHHeCikhalg

Instagram: https://www.instagram.com/aueb.gr/

ACADEMIC AUTHORITIES

The rectorate authorities consist of the Rector and the Vice Rectors, as per below:

Rector:

Professor Dimitris Bourantonis

Vice Rectors:

Vice Rector of Academic Affairs and Personnel
Professor Vasilios Vasdekis

Vice Rector of Research and Lifelong Learning
Associate Professor Georgios Lekakos

Vice Rector of Financial Planning and Infrastructure
Professor Konstantinos Drakos

Vice Rector of International Cooperation and Development
Professor Vasilios Papadakis

School of Information Sciences and Technology
Dean: Professor Ioannis Kotidis
Department of Statistics
Chair: Professor Ioannis Ntzoufras
Master's Program
Director: Professor Stylianos Psarakis
Contact details
Address: 47A Evelpidon & 33 Lefkados Street, Athens, 113 62, Greece

Telephone number: +30 210 82 03 681
e-mail: masterst@aueb.gr
Website: https://aueb-analytics.wixsite.com/msc-stats/

ACADEMIC CALENDAR

FALL SEMESTER

Classes begin:	October 3, 2022
Break before Christmas Holidays:	December 23, 2022
Classes restart:	January 8, 2023
Classes end:	January 10, 2023

Exam period January-February 2021

Start of Exams:	January 17, 2023
End of Exams:	January 31, 2023

Holidays

October 28, 2022
November 17, 2022
January 6, 2023
January 30, 2023

SPRING SEMESTER

Classes begin:	February 1, 2023
Break before Easter Holidays:	April 10, 2023
Classes restart:	April 24, 2023
Classes end:	June 9, 2023

Exam period June 2021

Start of Exams:	June 12, 2023
End of Exams:	June 30, 2023

Holidays

February 27, 2023
May 1, 2023
June 5, 2023

AUEB's OPERATIONAL STRUCTURE

The structure and operation of the Institution is defined by current legislation as in force. The Athens University of Economics and Business is under the supervision of the Ministry of Education, Research and Religious Affairs. Its governing bodies include:

The Governing Council
The Senate
The Rector
The Vice-Rectors
The Executive Director

Until the Governing Council assumes its duties, administration is exercised by the University's Rector's Council

AUEB's ACADEMIC STRUCTURE

The Athens University of Economics and Business is structured by academic units of two (2) levels: a) the Schools, and b) the Departments

Each School is structured by at least two (2) Departments, covers a domain of related scientific areas, and ensures the interdisciplinary approach to teaching and research between its departments. The School is responsible for supervising and coordinating the operation of the Departments and the educational and research work produced, in accordance with the Internal Operating Regulations.

The bodies of the School, according to Law 4957/2022 (A 141) as applicable are: a) the Dean and b) the Dean's Council

The Department is the University's fundamental academic unit and aims to advance a specific field of science, technology, letters and arts through education and research. The Department consists of all the members of the Teaching & Research Staff (DEP), the members of the Special Education Staff (EEP), the members of the Laboratory Teaching Staff (EDIP) and the members of the Special Technical Laboratory Staff (ETEP).

Bodies of the Department according to Law 4957/2022 (A 141) as applicable are: a) the Assembly, b) the Board of Directors, c) the Head/Chair and d) the Deputy Head/Chair.

The Athens University of Economics and Business consists of three Schools & eight Departments:

1. **SCHOOL OF ECONOMIC SCIENCES**

   Department of International and European Economic Studies

   Department of Economics.

2. **SCHOOL OF BUSINESS**

   Department of Management Science and Technology

   Department of Business Administration

   Department of Accounting and Finance

   Department of Marketing and Communication**.**

3. **SCHOOL OF INFORMATION SCIENCE AND TECHNOLOGY**

   Department of Informatics

   Department of Statistics

ADMINISTRATIVE BODIES OF POSTGRADUATE STUDY PROGRAMS

Competent bodies for the organization and operation of the Postgraduate Study Programs are:

a) the Senate,
b) the Assembly of the Department,
c) the Coordinating Committee (CC), and
d) the Director of the Postgraduate Program.

Especially for inter-departmental, inter-institutional and joint programs, the responsibilities of the Department's Assembly are exercised by the Curriculum Committee

UNIVERSITY STAFF

The University staff consists of the following categories:

- TEACHING STAFF:

- Teaching & Research Staff (DEP)
- Emeritus Professors
- Visiting Professors
- Special Education Staff (E.E.P.)
- Laboratory Teaching Staff (E.DI.P.)
- Special Technical Laboratory Staff (E.T.E.P.)
- Auxiliary Teaching Staff
- Teaching Fellows
- Scientific Faculty Members
- Adjunct Instructors
- Secondet Teachers

- **ADMINISTRATIVE STAFF**

SERVICES

The Athens University of Economics and Business provides both administrative and other services (meals, housing, library, sport facilities etc.) aiming at serving both its students and staff. More information on the organization and operation of the University's services can be found on the University΄s website (http://www.aueb.gr/en).

GENERAL DESCRIPTION OF THE UNIVERSITY

The Athens University of Economics and Business (AUEB), as a Higher Educational Institution, is a legal entity governed by public law and supervised by the Ministry of Education, Research and Religious Affairs.

AUEB is, in order of seniority, the third Higher Education Institution of the country and the first in the fields of Economics and Business Administration. Later, the scientific fields of Informatics and Statistics were added. Since its founding, in 1920, AUEB has a rich and noteworthy tradition of significant academic achievements that define the present and create excellent prospects for the future.

The University as a center of excellence, in academic research and teaching, is rated as one of the leading universities in its subject areas in Greece and one of the best internationally. The high level of its scientific staff, the quality in teaching and research, the modern curriculum/courses, but also the high demand of its graduates enhance significantly the University's brand name and reputation, in Greece and abroad.

LIST OF DEGREE PROGRAMMES

Athens University of Economics and Business offers the following Degrees and streams:

A/A	DEPARTMENTS	SPECIALIZATIONS
1.	International and European Economic Studies	1. International Economics and Finance 2. International and European Political Economy
2.	Economics	1. Economic Theory and Policy 2. Business Economics and Finance 3. International and European Economics
3.	Management Science and Technology	1. Operations Research and Business Analytics 2. Operations and Supply Chain Management 3. Software and Data Analysis Technologies 4. Information Systems and Electronic Business 5. Strategy, Entrepreneurship and Human Resources
4.	Business Administration	1. Business Administration 2. Information Systems Management 3. Accounting and Financial Management 4. Marketing
5.	Accounting and Finance	1. Accounting 2. Finance
6.	Marketing and Communication	1. International Management, Innovation and Entrepreneurship 2. Human Resource Management 3. Business Analytics 4. Digital Marketing
7.	Informatics	1. Theoretical Computer Science 2. Computer Systems and Networks 3. Information Systems and Information Security 4. Databases and Knowledge Management 5. Operational Research and Economics of Information Technology 6. Computational Mathematics and Scientific Calculations
8.	Statistics	No specializations are offered

Detailed information about programs and curriculum is provided in each department's study guide and website.

Chief Regulations of the University (including academic recognition procedures)

The regulations include, for example:

- The University's Internal Operating Regulations
- The Organization of Administrative Services
- The Regulations for the Operation of Postgraduate and Doctoral Study Programs
- The Internal Regulation for conducting postdoctoral research

AUEB'S ECTS COORDINATOR

The University's ECTS Coordinator is the Quality Assurance Chairperson, who ensures the University's compliance with the principles and rules of the European credit accumulation and transfer systems, supervises compliance and implementation and is responsible for the full recognition and transfer of credit units.

PART II: INFORMATION ON DEGREE PROGRAMS

(A) General Description

Qualification awarded

The Postgraduate Program awards a **Master Degree in Applied Statistics.**

Admission requirements

The program accepts university graduates, from Greek or non-Greek higher education institutions that have been recognized from the Hellenic NARIC organization (DOATAP), according to the law 4957/2022. Applicants that have not yet graduated from their universities' must submit a solemn statement of Law No. 1599/86 that if selected for the MSc program, they will have completed their undergraduate studies until the forthcoming September.

Admission criteria/Registration Procedure

The program accepts university graduates, from Greek or non-Greek higher education institutions that have been recognized from the Hellenic NARIC organization (DOATAP), according to the law 4957/2022.

Foreign students must have proficient knowledge of the Greek language (they must either have graduated from the Hellenic high school (lyceum) or have a GAT Greek language certificate).

The program accepts up to forty (40) students per year.

Applicants selection is made according to the provisions of the Law No. 4957/2022 and the program's Academic Regulations as published in the Governmental Gazette No. 5364B(7-12-20).

The Following documents must be submitted with the application, as indicated in the official call for applications:

1. Online application form http://e-graduate.applications.aueb.gr
2. Curriculum Vitae
3. Copies of all University Degrees / Diplomas and Official Transcripts of marks received. Applicants that have not yet graduated from their universities' must submit a solemn statement of Law No. 1599/86 that if selected for the MSc program, they will have completed their undergraduate studies until the forthcoming September.
4. Certified copy of the English language certification verifying good command of the language (at least level B1.
5. Two confidential recommendation letters (for FT applicants only academic references are accepted, while for PT applicants employer's references are also accepted)

6. For non-Greek university degrees recognition by the Hellenic National Academic Recognition Information Centre (DOATAP) is required according to the Law No. 4957/2022.

The applicant's evaluation process has as follows:

The Admissions Committee

a) Compiles a table of all applicants
b) Rejects all applicants that do not meet the minimum prerequisites that have been set by the Departmental Assembly.
c) Calls all eligible applicants for a personal interview with at least two members of the Admissions Committee.
d) Ranks all applicants according to the above mentioned quantitative and qualitative criteria and selects the ones that will be accepted.
e) The final list of accepted applicants is validated by the Departmental Assembly.

Educational and professional goals

The Postgraduate Program in Applied Statistics has as its object the provision of specialized postgraduate knowledge to graduates of Greek and recognized foreign universities in the main fields of Statistics and Probability. In particular, the object of the Program is the education of postgraduate students in the following areas: a) Data analysis, b) Biostatistics, c) Computational Statistics of Big Data, d) Applied Probability.

The program aims to:

1. The creation of specialized scientists in areas that are compatible with the research activity, the corresponding specializations of the undergraduate study program and with the scientific staff of the department.
2. The training of senior executives for companies and organizations in the private and public sector that may cover their needs in for specific applications in data analysis.
3. To promote the University globally, to develop networks of cooperation with the international scientific community and the greatest possible activity within the framework of the opportunities offered in Europe and in the wider world.
4. In the interconnection of the educational process with the needs of the market and the economy in general.

Access to further studies

Access to the PhD Program – 3rd Cycle.

Course structure diagram with credits:

The course structure diagram with credits for the Academic Year 2022-23 is defined as follows:

1st Semester *(each student selects all three **(3)** courses)*	**ECTS**
Applied Probability -Estimation	5

Hypothesis Testing – Linear Models	5
Statistical Applications using R	5
Total (1st semester)	**15**
2nd Semester *(each student selects all three **(3)** courses)*	
Optimization Techniques	5
Generalized Linear Models	5
Time Series Analysis and Forecasting using R	5
Total (2nd semester)	**15**
3rd Semester *(each student selects all two **(2)** courses) and courses from the "elective courses" list)*	
Medical Statistics	5
Computational Statistics using R	5
Elective Courses (from the list below)	
4th Semester *(each student selects courses from the "elective courses" list)*	
Elective Courses (from the list below)	
***Elective Courses** (each student selects four **(4)** courses from the "elective courses" list below*	
Applied Bayesian Statistics	5
Statistical Learning	5
Survival Analysis	5
Sampling	5
Quality Control and Reliability	5
Clinical Trials	5
High dimensional Statistics	5
Financial Mathematics with Applications in MATLAB and PYTHON	5
Inventory Theory and Supply Chain Management	5
Total (2nd & 4th semesters)	**30**
5th Semester	
MSc Thesis	30
TOTAL	**90**

Examination and assessment regulations

The final grade of each course is determined by the respective teachers. The degree may involve individual and group work of students. Participation in the exams on the specific date announced according to the exam schedule is mandatory.

The examinations grading scale is set from zero (0) to ten (10), half grades are also awarded. The passing grade is five (5) or higher.

A student who fails a course is re-examined in the following examinations' period. If a student fails in the following examinations' period then he is entitled to be examined in the next exam of the course and in

case of failure he is dropped from the program and is only entitled to a certificate for courses successfully attended.

In order to be awarded the Master's degree, students must achieve passing grades in all courses as well as the Master's dissertation in the designated time period. If not, then students are dropped from the program, and are only entitled to a certificate for courses successfully attended.

(B) Description of individual course units

Applied Probability - Estimation (62101)

Instructors: E.KYRIAKIDIS

Core Course, 1st semester, 5 ECTS units
Course level: Graduate (MSc)
Language: Greek

Course Description

Random Experiment. Sample Space. Axioms of Kolmogorov. Properties of Probabilities. Law of total probability. Bayes's Rule. Discrete and Continuous random variables. Expected value and variance of random variables. Binomial distribution. Geometrical Distribution. Poisson Distribution. Hypergeometrical Distribution. Uniform Distribution. Exponential Distribution. Normal Distribution. Central Limit Theorem. Law of Large Numbers. Estimator of unknown parameter. Unbiased Estimator. Consistent Estimator. Sufficient Estimator. Rao-Blackwell Estimator. Cramer-Rao lowe bound. Method of maximum likelihood. Methods of moments.

Prerequisites

Knowledge of Calculus.

Target Learning Outcomes

- The students will be able to compute probabilities of events, expected values and variances of discrete and continuous random variables. They will also be able to apply the central limit theorem and find estimates of unknown parameters.
- The students will be able to solve realistic problems that are related with random experiments.

Recommended Bibliography

- S. M. Ross, "A first course in Probability"
- G. Roussas, "Statistical Inference"

Teaching and Learning Activities

In Class, distant learning.

Assessment and Grading Methods

Written final exam, Assignments.

Hypothesis Testing – Linear Models (62102)

Instructors: I.VRONTOS – ST.PSARAKIS

Core Course, 1st semester, 5 ECTS units
Course level: Graduate (MSc)
Language: Greek

Course Description
In this course we present the confidence intervals, the statistical hypothesis theory, the pronciples of linear regression (simple and multivariate), the Analysis of Variance and their applications.

Prerequisites
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Applied Probability – Estimation.

Target Learning Outcomes
The students after attending successfully the course will be able, using the appropriate methodology, to construct confidence intervals that will contain the unknown parameters with the desirable probability and to perform hypothesis testing in various problems. They will be able to apply the basic tools of regression analysis, to various problems of economics and business administration. More specifically, they will be able to analyze, construct and estimate an appropriate model (simple or multivariate) and make inference on the results of the estimation procedure.

Recommended Bibliography
- Draper N, Smith H (1998) Applied Regression Analysis 3rd Edition Wiley
- Montgomery D (2012) Introduction to Linear regression Analysis, 5th Edition Wiley.
- Montgomery D. and Runger GC (2018) Applied Statistics and Probability for Engineers 7th Edition Wiley

Teaching and Learning Activities
One three-hour lecture per week and study exercises as homework (some to be submitted).

Assessment and Grading Methods
90% Written examination. 10% project/assignment based on simulated data applying the methodologies and techniques described during the course accompanied with short scientific report.

Statistical Applications using R (62103)

Instructors: P.BESBEAS

Core Course, 1st semester, 5 ECTS units
Course level: Graduate (MSc)
Language: Greek

Course Description

The course provides an introduction to modern applied statistics and elementary programming via the statistical programming language R. The course provides an inclusive guide to R, developing a skill set to efficiently perform technical computations, whilst at the same time covering a variety of statistical techniques to analyse data, ranging from standard material like descriptive statistics, estimation, and hypothesis testing to intermediate methods like linear regression, model selection and diagnostics.

Prerequisites

Applied Probability – Estimation. Hypothesis Testing – Linear Models.

Target Learning Outcomes

On successfully completing the module students will be able to

- demonstrate proficiency in the use of computing utilities and the statistical package R;

- show judgement in the application of R;

- make effective and well-considered use of R

- use suitable statistical methods to analyse data

- use information technology effectively for introductory data analysis including data retrieval.

Recommended Bibliography

- J. Verzani. Using R for Introductory Statistics (2nd edition, CRC Press, 2014)
- Crawley M. J. The R Book, Wiley 2009
- Chatfield, C. Problem–solving: a statistician's guide. London, Chapman and Hall. 1995
- Cox, D.R. and Snell E.J. Applied Statistics: Principles and Examples (Chapman Hall statistics text series) 1987.

Teaching and Learning Activities

24 hours of lectures and terminal classes. 75 hours independent study.

Assessment and Grading Methods

Assessment: The unit is assessed by a combination of examination and continuous assessment.
Continuous Assessment: Open book written assessment completed in independent study hours.
Examination: A final written examination in the examination period.

Optimization Techniques (62104)

Instructors: A.YANNACOPOULOS – M.ZAZANIS

Core Course, 2nd semester, 5 ECTS units
Course level: Graduate (MSc)
Language: Greek

Course Description

The course introduces the basic concepts and techniques of Optimization theory with an emphasis on applications in various fields such as e.g. statistics, machine learning, finance etc.

Techniques are covered from linear and integer programming, convex optimization, duality methods, stochastic optimization, non smooth programming as well as computational algorithms such as e.g. gradient methods, stochastic gradient schemes, Newton and quasi Newton schemes etc.

Prerequisites

None.

Target Learning Outcomes

Upon successful completion of the course, students will learn the fundamental concepts and techniques of the theory of Optimization and they will be able to apply these techniques in the context of problems in Statistics.

Recommended Bibliography

- S. Boyd and Vanderberghe, Convex optimization, Cambridge University Press
- J. Nocedal, Numerical Optimization, Springer.
- D. Kravvaritis and A. N. Yannacopoulos, Variational Methods in Nonlinear Analysis with applications in Optimization and PDEs. De Gruyter, Chapters 4 and 5.
- Α. Ν. Γιαννακόπουλος, Βελτιστοποίηση και εφαρμογές, Σημειώσεις μαθήματος

Teaching and Learning Activities

In vivo or by distance teaching, computational applications.

Assessment and Grading Methods

Essays and mini projects within the term.

Generalized Linear Models (62105)

Instructors: V.VASDEKIS

Core Course, 2nd semester, 5 ECTS units
Course level: Graduate (MSc)
Language: Greek

Course Description
Introduction to statistical modeling, exponential family of distributions, parts of a GLM, analysis of binomial data, logit models, Poisson models, log-linear models for analysis of categorical data, analysis of overdispersion, normal data, multinomial and ordinal data. All applications include the use of the R language.

Prerequisites
Students should have basic knowledge of mathematical calculus and probability theory.

Target Learning Outcomes
Upon successful completion of the course, students are expected to understand if the nature of their data allows application of a generalized linear model (knowledge and understanding). They should also be able to define the appropriate generalized linear model to the data at hand (application). They should be able to fit this model and interpret the results of analysis (skill). Finally, they should be able to explain to scientists of other disciplines the results of their analysis (synthesis).

Recommended Bibliography

- Agresti (2013). Categorical data analysis, Wiley Atkinson (1985). Plots, transformations and regression, Oxford university Press
- Carroll and Ruppert (1988). Transformation and weighting in regression, Chapman and Hall
- Chatterjee and Price (1977). Regression analysis by example, Wiley.
- Christensen R. (1998). Analysis of variance, design and regression. Chapman and Hall.
- Collett, D. (1991) Modelling Binary data, Chapman and Hall
- Cook and Weisberg, S. (1982). Residuals and Influence in regression, Chapman and Hall
- Dobson, A., Barnett, A.G (2008). An introduction to generalized linear models, Chapman and Hall.
- Draper and Smith (1981). Applied regression analysis, Wiley.
- McCullagh, P and Nelder, J.A. (1989) Generalized Linear Models, Chapman and Hall.
- Montgomery, D.C. (1989) Design and Analysis of Experiments, Wiley
- Montgomery, D.C., Peck, E.A. and Vining, G.G. (2001). Introduction to linear regression analysis. Wiley.
- Ryan (1997). Modern regression methods, Wiley.
- Weisberg, S. (1985) Applied Linear Regression, Wiley
- Venables W.N. and Ripley B.D (1999) Modern Applied Statistics with S-Plus, Springer

Teaching and Learning Activities

One three-hour lecture per week, study exercises as homework (some to be submitted).

Assessment and Grading Methods

The final grade is the weighted average of the final examination grade (70%) and the grade of the study exercises to be submitted (30%).

Time Series Analysis and Forecasting με R (62106)

Instructors: I.VRONTOS – A. LIVADA

Core Course, 2nd semester, 5 ECTS units
Course level: Graduate (MSc)
Language: Greek

Course Description

This course provides the theory and practice of time series analysis. It introduces the deterministic type of models and the decomposition of a given time series into its components: a trend, a seasonal and an irregular component. The course presents and describes different models for estimating trend and seasonal effects. It introduces linear filters and exponential smoothing techniques. It also introduces the basic theory of stationary processes (characteristics of stationary and non-stationary time series and unit root testing), it describes and presents analytically stochastic time series models, ARMA models in particular, and the Box-Jenkins methodology for ARIMA models. The course introduces the class of conditional heteroscedastic models (ARCH/GARCH), and presents practical time series forecasting techniques. Illustrative examples applying time series models/techniques to actual economic and financial data are also presented using R package and the econometric package Eviews. The empirical analysis consists of (a) unit root testing to exchange rate series and financial series, e.g. stocks and indices, and (b) modeling and forecasting economic/financial time series..

Prerequisites

Students should have basic knowledge of statistics and linear models.

Target Learning Outcomes

The aim of this course is to provide students with the learning of using appropriate time series models and techniques required for the analysis of time series data. After successfully completing the course, students will be able to:

- know deterministic time series modeling
- know the basic concepts of stationary processes
- have learned the ARMA stochastic time series models
- have learned about the time-varying ARCH/GARCH volatility models
- be able to apply the Box-Jenkins methodology in empirical applications
- be able to model and forecast time series data
- know how to implement time series analysis using R and Eviews

Recommended Bibliography

- Hamilton, James D. Time Series Analysis. Princeton, New Jersey: Princeton University Press, 1994.
- Enders, Walter. Applied Econometric Time Series. New York: Wiley, 2010.

- Cowpertwait, Paul S.P., and Metcalfe V. Andrew. Introductory Time Series with R. New York: Springer Texts in Statistics, 2009.
- Cryer, Jonathan D., and Chan Kung-Sik. Time Series Analysis with Applications in R. Springer Texts in Statistics, 2010.
- Gujarati, Damodar N. Basic Econometrics. New York: McGraw-Hill, 2008.
- Pindyck, R.S. and D.L. Rubenfeld. Econometric Models and Economic Forecasts. New York: McGraw-Hill, 1991.
- Shumway, Robert H. and David S. Stoffer. Time Series Analysis and Its Applications with R Examples. New York: Springer Texts in Statistics, 2011.
- Tsay, Ruey S. Analysis of Financial Time Series. New York: Wiley, 2010.
- Wooldridge, Jeffrey. Introductory Econometrics: A Modern Approach. South-Western College Publishing, 2009.
- Granger, C.W.J. and Paul Newbold. Forecasting Economic Time Series. San Diego, CA: Academic Press, 1986.

Teaching and Learning Activities

One three-hour lecture per week, study exercises, and programming exercises as homework (some to be submitted).

Assessment and Grading Methods

The final grade is the average of the final examination grade (weight 80%) and the grade of the study and programming exercises to be submitted (weight 20%), provided that the final examination grade is at least 5/10. Otherwise, the final grade equals the final examination grade.

Medical Statistics (61216)

Instructors: X.PEDELI

Core Course, 3rd semester, 5 ECTS units
Course level: Graduate (MSc)
Language: Greek

Course Description
Medical/Epidemiological studies and a comparative approach to their advantages and disadvantages. Risk measures: suitability by study type and statistical theory with real data applications. Deconfounding, stratification and effect modification. The last part of the course is concerned with Epidemic models, the basic SIR model, its behaviour, the reproduction rate Ro and disease control.

Prerequisites
Probability, Statistics and computational methods.

Target Learning Outcomes
At the end of the course each student will become familiar with the basic types of medical study and the appropriate method of statistical analysis by study, including their practical application. They will also become aware of the main techniques for correcting for confounders. Finally they will understand the basic principles of disease transmission and the calculations involved in disease control.

Recommended Bibliography
Lecture notes and Rosner's book "Fundamentals of Biostatistics".

Teaching and Learning Activities
Weekly lectures and assignments.

Assessment and Grading Methods
Written exam.

Computational Statistics using R (62107)

Instructors: P.BESBEAS

Core Course, 3rd semester, 5 ECTS units
Course level: Graduate (MSc)
Language: Greek

Course Description

The course aims to develop a broad and thorough knowledge of modern statistical computing techniques, to enable use of advanced statistical modelling and inference methods in practice.
In more complex situations this will mean using numerical optimisation routines to obtain maximum likelihood estimates for the model parameters, and modern computational power to simulate distributional properties of estimators and test statistics. The course also considers how to evaluate such stochastic models. Outline syllabus includes: Numerical function optimisation. Numerical maximum likelihood and likelihood tools for inference.
Simulation techniques. Inferences using Monte-Carlo and resampling methods. The methods are implemented in the statistical programming language R, and illustrated using detailed real examples.

Prerequisites

- Applied Probability – Estimation.
- Hypothesis Testing – Linear Models.
- Statistical Applications using R.

Target Learning Outcomes

On successfully completing the module students will be able to:

- demonstrate systematic understanding of computational statistics
- demonstrate the capability to deploy established approaches accurately to analyze and solve problems in the following areas: function optimization, numerical aspects of maximum likelihood estimation, simulation methods and Monte Carlo, resampling
- apply a range of computational statistics methods, showing good judgment in the selection and application of tools and techniques
- write R programs for complex applications, making effective and well-considered use of R

Recommended Bibliography

- Rizzo, Maria. 2014. Statistical Computing with R. Chapman and Hall.
- Voss, Jochen. 2013. An introduction to statistical computing: A simulation-based approach. Wiley.
- Eubank, R. and A. Kupresanin. 2011. Statistical Computing in C++ and R. Chapman and Hall.
- Givens, Geof and Hoeting, Jennifer. 2012. Computational Statistics. Wiley.
- Gentle, James. 2009. Computational Statistics. Springer.
- Martinez, Wendy and Martinez, Angel. 2015. Computational Statistics Handbook with Matlab. Chapman and Hall.

- Gentle, James. 2013. Elements of Computational Statistics. Springer.

Teaching and Learning Activities

24 hours of lectures and terminal classes. 75 hours independent study.

Assessment and Grading Methods

Assessment: The unit is assessed by a combination of examination and continuous assessment.
Continuous Assessment: Open book written assessment completed in independent study hours.
Examination: A final written examination in the examination period.

Applied Bayesian Statistics (61219)

Instructors: I.NTZOUFRAS

Elective Course, 3rd or 4th semester, 5 ECTS units
Course level: Graduate (MSc)
Language: Greek

Course Description

This course will provide the introduction to the Bayesian approach in statistics both from the theoretic and the computational perspective using R and WinBUGS. The course syllabus includes: Bayesian inference. Conjugate Analysis. Simulation and random number generation. Markov models and hidden Markov (MCMC) methods. Metropolis-Hastings algorithm, Gibbs sampling. Introduction to WinBUGS. Bayesian inference for Regression and GLMs. Hierarchical models. Bayesian model and variable selection.

Prerequisites

The students should have a good quantitative and computational background. Specifically, knowledge in the fields of calculus, probability/distribution theory, statistical modelling and R programming will be necessary for this course.

Target Learning Outcomes

Upon completion of the course, students will be able to:

- Understand the basic theory and philosophy of Bayesian Statistics
- Understand the basic notions of Bayesian computation
- Analyze data using WinBUGS
- Build models (glm and hierarchical) in WinBUGS
- Perform Bayesian variable selection using WinBUGS and BAS package in R.

Recommended Bibliography

- Ntzoufras, I. (2009). Bayesian Modeling Using WinBUGS. Wiley. Hoboken. USA.
- Carlin B. and Louis T. (2008), Bayes and Empirical Bayes Methods for Data Analysis. 3rd Edition, London: Chapman and Hall.
- Gelman A., Carlin J.B., Stern H.S., Dunson, D.B., Vehtari, A. and Rubin D.B. (2013). Bayesian Data Analysis. Third Edition. Chapman and Hall/CRC.
- P. Dellaportas and P. Tsiamyrtzis, “Introduction to Bayesian Statistics” (in Greek)

Teaching and Learning Activities

- Live teaching in a lecture room or computer labs
- Informal labs for using R and WinBUGS/OpenBUGS/JAGS
- Evaluation of current knowledge using Kahoot web game
- Interim optional exercises

- Personalized assignment/project

Assessment and Grading Methods

The course is examined by a big project/assignment that contributes 100% of the final grade. The students can break the final outcome/assignment in smaller landmark exercises (optional) that will help him to construct the final project report.

Statistical Learning (61220)

Instructors: I.PAPAGEORGIOY

Elective Course, 3rd or 4th semester, 5 ECTS units
Course level: Graduate (MSc)
Language: Greek

Course Description
A range of statistical learning methods is studied. For supervised learning: (i) Classification problems and methods such as LDA, QDA, k-nn, decision trees (ii) data reduction problem, principal components analysis, factor analysis. For unsupervised learning: clustering (hierarchical, optimization clustering, model-based). Model Assessment and Selection.

Prerequisites
Multivariate analysis. Statistical inference.

Target Learning Outcomes
Upon completion of the course, students will have the knowledge and the skills to implement statistical methods aiming to deal with the problem of classification, data dimension reduction, factor analysis and clustering. They will be able to interpret the results and assess the methodologies' performance.

Recommended Bibliography
- Hastie, Tibshirani and Friedman (2009) Elements of Statistical Learning, 2nd edition Springer
- James, Witten, Hastie and Tibshirani (2011) Introduction to Statistical Learning with applications in R, Springer
- B. S. Everitt, S. Landau, M. Leese, and D. Stahl (2011) Cluster Analysis, Fifth Edition, Wiley

Teaching and Learning Activities
Face to face teaching covering theory and practice. The practicals are implemented with R.

Assessment and Grading Methods
Written exam and projects.

Survival Analysis (62203)

Instructors: G.BAKOYANNIS

Elective Course, 3rd or 4th semester, 5 ECTS units
Course level: Graduate (MSc)
Language: Greek

Course Description
The survival and hazard functions are presented along with the likelihood function and its use in nonparametric estimation (Kaplan-Meier and Nelson-Aalen estimators). Time to event data are modelled in a parametric and semiparametric manner. The Cox proportional hazards model is utilised and appropriate residuals, including martingale, deviance and Schoenfeld are defined. An introduction to time-dependent covariates and competing risks concludes the course.

Prerequisites
Probability, Statistics and computational methods.

Target Learning Outcomes
Each student will become familiar with the basic principles of survival data, the Kaplan-Meier estimator and parametric modelling. They will be able to use the Cox model, select its variables and assess the model via the appropriate residuals.

Recommended Bibliography

David Collett. Modelling Survival Data in Medical Research. 3rd Edition. CRC Press.

Teaching and Learning Activities
Weekly lectures and assignments. Detailed presentation of the relevant R code.

Assessment and Grading Methods
70% of the grade will be based on the final assignment which is based on the analysis of real time to event data and 30% of the grade is based on the assignments.

Sampling (62205)

Instructors: I.PAPAGEORGIOY

Elective Course, 3rd or 4th semester, 5 ECTS units
Course level: Graduate (MSc)
Language: Greek

Course Description

The module includes a presentation of

- Basic sampling techniques for probability sampling. The presentation includes implementation of each sampling method and estimation of population parameters. Specialized R packages for illustration.
- Methods for improving the estimation: using auxiliary information, sampling proportional to size. Illustration via packages in R.

Practical problems during the implementation of sampling surveys

- Methods to approximately calculate the estimation of variance for the obtained estimates in complex sampling designs.
- Non-response. How to identify the type of and how to treat non-response. Imputation and re-weight methods. Implementation in R.

Prerequisites

Probability, Estimation, Statistical inference.

Target Learning Outcomes

Upon completion of the course, students will have the knowledge and the skills to implement sampling techniques to collect data for a sampling survey and derive statistical results with respect to population parameters. Moreover, to make use either previous or auxiliary information to improve statistical properties of the derived estimates. Students will have the technical skills to recognize the type of and treat the non-response in a survey.

Recommended Bibliography

- Barnett, V. (2002). Sample survey: Principles and methods. 3rd Edition, London: Arnold.
- Cochran, W. G. (1977). Sampling techniques (3rd Edition). New York: John Wiley and Sons
- Fink, A. (2013). *How to Conduct Surveys: A Step-by-Step Guide.* 5th Edition. Sage Publications.
- Groves, R.M. Floyd, J., Fower, Jr., Couper, M.P., Lepkowski, J.M., Singer, E., & Tourangeau, R. (2009). *Survey Methodology*. 2nd Edition, Wiley-Blackwell.
- Levy, P.S. and Lemeshow, S. (1999). *Sampling of Populations. Methods and Applications* (3rd Edition). New York: John Wiley and Sons.
- Lohr S. L. (2010). Sampling: Design and analysis (2nd Edition). Pacific Grove, CA: Duxbury Press.

Teaching and Learning Activities

Face to face teaching covering theory and practice. The practicals are implemented with R.

Assessment and Grading Methods

Written exam and projects.

Quality Control and Reliability (61222)

Instructors: ST.PSARAKIS

Elective Course, 3rd or 4th semester, 5 ECTS units
Course level: Graduate (MSc)
Language: Greek

Course Description
Definition of quality. Basics on statistical quality control and reliability. An introduction to Acceptance sampling and Design of Experiments. Metrology and reliable measurements. Cause and effect chart and Pareto chart. The philosophy of statistical process control. Control charts for variables and attributes. Individual control charts. EWMA and CUSUM charts Capability indices. Control charts for autocorrelated data. Introduction to multivariate control charts. Basics of six sigma methodology.

Prerequisites
Students should have good knowledge of estimation and statistical inference. It is also useful to have basic knowledge of the statistical language R.

Target Learning Outcomes
The student after the course will acquire the skills needed to deal with problems of controlling and improving the quality and the reliability of products or services using statistical methods.

Recommended Bibliography

- Montgomery D (2019) Introduction to Statistical Quality Control, 8th Edition Wiley.
- Qiu P. (2013) Introduction to Statistical Process Control, CRC Press.
- Ταγαράς Γ.(2001) Στατιστικός Έλεγχος Ποιότητας, εκδόσεις ΖΗΤΗ.

Teaching and Learning Activities
One three-hour lecture per week and study exercises as homework (some to be submitted).

Assessment and Grading Methods
85% Written examination.
15% project/assignment based on simulated data applying the methodologies and techniques described during the course accompanied with short scientific report.

Clinical Trials (61226)

Instructors: V.VASDEKIS

Elective Course, 3rd or 4th semester, 5 ECTS units
Course level: Graduate (MSc)
Language: Greek

Course Description
Principles of Clinical Trials (CT), trials types, CT protocol, blinding, randomization methods, sample size, ITT, PP, TR populations, covariate adjustment, cross-over trials, analysis of repeated measures data, linear mixed models, GEE models, introduction to meta-analysis.

Prerequisites
Students should have basic knowledge of mathematical calculus, probability theory and generalized linear models.

Target Learning Outcomes
After successfully completing the course, students will be able to:

- write the statistical parts of a CT protocol,
- find the appropriate size of a CT,
- randomize patients into experimental groups,
- analyze clinical trials data,
- perform a basic meta-analysis using statistical techniques.

Recommended Bibliography

- Everitt, B.S. and Pickles, A. (1999). Statistical Aspects of the Design and Analysis of Clinical Trials, Imperial College Press.
- Chow, S-C. and Liu, J-P. (2013). Design and Analysis of Clinical Trials, Wiley.
- Fitzmaurice, G.M., Laird, N. and Ware, J. (2004). Applied longitudinal data analysis, Wiley.
- Whitehead, A. (2002). Meta-Analysis of Controlled Clinical Trials. Wiley.

Teaching and Learning Activities
One three-hour lecture per week, study exercises as homework (some to be submitted).

Assessment and Grading Methods
The final grade is the weighted average of the final examination grade (60%) and the grade of the study exercises to be submitted (40%).

High Dimensional Statistics (61227)

Instructors: P.PAPASTAMOULIS

Elective Course, 3rd or 4th semester, 5 ECTS units
Course level: Graduate (MSc)
Language: Greek

Course Description

Modern statistical applications deal with the analysis of high-dimensional datasets. However, inference is extremelly challenging due to the curse of dimensionality: as the number of variables increases, the data may become quite noisy and it is difficult to separate the actual underlying information. The course will present modern statistical techniques particularly suited to problems with high dimensionality, such as:

- large scale hypothesis testing
- statistical applications in bioinformatics
- applications of (generalized) linear models in big data problems
- Regularization tecnhiques (LASSO, Ridge regression)
- Classification and model-based clustering for multivariate data with dimensionality reduction techniques

Prerequisites

- Prerequisites
  - Hypothesis Testing - Linear Models
  - Generalized Linear Models
- Some basic knowledge on
  - Computational Statistics
  - R programming
- Students will also benefit from the following courses (not required)
  - Applied Bayesian Statistics
  - Statistical Learning

Target Learning Outcomes

After completing the course, the students will:

- know the challenges that big data impose to the statistician
- properly deal with large scale hypothesis testing
- put their hands on many different types of data from cutting edge research areas such as bioinformatics
- learn many novel statistical ideas and methods developed in the last 20 years
- know how to apply the relevant methods using R and Bioconductor.

Recommended Bibliography

- Christophe Giraud (2015). Introduction to High-Dimensional Statistics. Philadelphia: Chap- man and Hall/CRC
- Tony Cai, Xiaotong Shen, eds. 2011. High-dimensional data analysis. Frontiers of Statistics.
- Singapore: World Scientific
- Hastie, R. Tibshirani and R. Friedman (2009). Elements of Statistical Learning. Springer
- Efron, Bradley. Large scale inference: Empirical Bayes Methods for Estimation, Testing and Prediction. Cambridge University Press, 2010
- McLachlan, G. and Peel, D (2000). Finite Mixture Models. Cambridge University Press, 2010

Teaching and Learning Activities

One three-hour lecture per week, study exercises and programming exercises as homework (some to be submitted).

Assessment and Grading Methods

The final grade will be a weighted average of 2 or 3 homework assignments.

Financial Mathematics with Applications in MATLAB and PYTHON (61224)

Instructors: A.YANNACOPOULOS

Elective Course, 3rd or 4th semester, 5 ECTS units
Course level: Graduate (MSc)
Language: Greek

Course Description
Introduction to fundamental concepts of financial mathematics and presentation of quantitative theoretical and computational tools for financial market analytics. Decision theory under uncertainty, introduction to the structure of financial markets and the nature of financial assets, asset pricing models, derivative products, bonds, portfolio theory and introduction to risk management techniques. Computational methods and techniques for the above using Python and Matlab (Octave) environments.

Prerequisites
None.

Target Learning Outcomes
To familiarize students with quantitative and computational techniques for financial market analytics as well as with the Python and Matlab (Octave) environment.

Recommended Bibliography
- Hull, J. C. (2015) Options, Futures, and Other Derivatives, 9th edition, Pearson
- McDonald, R. L. (2013), Derivatives Markets, 9th edition, Prentice Hall
- Shreve, S. (2005), Stochastic calculus for finance Vols. I and II, Springer
- Γιαννακόπουλος Α. (2014) Στοχαστικά Χρηματοοικονομικά (σημειώσεις)

Teaching and Learning Activities
In vivo or by distance teaching, computational applications.

Assessment and Grading Methods
Essays and mini projects within the term.

Inventory Theory and Supply Chain Management (62211)

Instructors: M.ZAZANIS – E.KYRIAKIDIS

Elective Course, 3rd or 4th semester, 5 ECTS units
Course level: Graduate (MSc)
Language: Greek

Course Description

Components of Inventory Models (cost of ordering, holding cost, shortage cost, backlogging, salvage cost, discount rate, lead time, continuous inspection of inventory, periodic inspection of inventory). Deterministic Continuous-Review Models (The basic EOQ Model, EOQ model with planned shortages, EOQ Model with quantity discounts, the role of Just-in-Time). A Deterministic Periodic-Review Model. Deterministic Multiechelon Inventory Models for Supply Chain Management. A Model for a Serial Multiechelon System. A Stochastic Cintinuous-Review Model. Safety Stock. The policy (s,S).

Prerequisites

Basic Knowledge of Probability and Calculus.

Target Learning Outcomes
Students after attending the course will be able to:

- Construct appropriate mathematical models for optimal inventory control in a wholesale or retail store as well as in a production system.
- To find the optimal order quantity as well as the time at which the order should be placed, if the inventory is continuously inspected, there is a constant rate of demand of the inventory and shortages of the inventory are not allowed.
- To find the optimal order quantity as well as the time at which the order should be placed, if the inventory is continuously inspected, there is a constant rate of inventory demand, and inventory shortages are allowed.
- To determine the optimal inventory policy in the case where the inventory is inspected periodically and the demands in different periods are not equal.
- To find the optimal order quantity and safety stock in the case where inventory is continuously inspected and the inventory demand is stochastic.
- To find the optimal order quantity and safety stock in the case where the stock is inspected at equidistant times and the stock demand is stochastic.
- To find the critical values s and S that characterize the optimal inventory policy (s,S) in one period problems with stochastic inventory demand.

Recommended Bibliography

S. Axsater, Inventory Control, 3rd Edition, Springer, 2015

F. S. Hillier and G. J. Lieberman, Introduction to Operations Research, 11th Edition, McGraw-Hill, 2019.

S. M. Ross, Applied Probability Models with Optimization Applications, Dover, 1992.

Teaching and Learning Activities

One three hour lecture per week and home study exercises.

Assessment and Grading Methods

Written examination and/or essays and mini projects within the term.

DISSERTATION THESIS (m62109p)

Core Course, 5th semester

ECTS units: 30

Course level: Graduate (MSc)

Language: Greek or English

Course Description

The dissertation thesis (DT) consists of the writing by the student of a research essay where the existing bibliography is studied, methodologies are studied and if needed they adopt to the current problem, research hypotheses are formulated, relevant data are collected and processed, empirical results are recorded and conclusions are drawn.

The content of the DT includes, indicatively, some of the following sections: Summary, Introduction, Literature review, Research Hypotheses Development, Description of the data, Empirical results, Simulations to support the findings, Summary and conclusions, Bibliography, Appendices.

Prerequisites

For the preparation of the DT, it is required that the courses of the Msc Program have been completed.

Target Learning Outcomes

The DT aims to give the opportunity to the student to develop and apply research methodologies in real data to topics of scientific interest related to the studies of the Msc program. The goal is for the student to delve deeper into the topic under consideration, study the existing literature, develop his critical thinking by formulating appropriate research hypotheses, collect and analyze appropriate empirical data and acquire skills of investigation and derivation of substantiated conclusions.

General skills expected from a student are the following

• To be able to search, analyze and synthesize data and information, using the necessary technologies.

• To be able to generate new research ideas and methodologies.

• To be able to use existing methodologies and tools but also to create new ones.

• To promote free creative and inductive thinking.

• To be able to develop research skills commensurate with the completion of a master's degree

• To enable the creation of a coherent and logically substantiated text that demonstrates competence in research and the ability to work independently

• Be able to address issues of research design, methodology, ethics and theoretical arguments

• To be able to develop skills in independent research.

Recommended Bibliography

- Regulations about the Master thesis in the MSc in Statistics program.
- Guidelines for the thesis and related templates.

Reference

McCullagh, P. (2023). *Ten projects in applied statistics*. Springer Nature.

Assessment and Grading Methods

The evaluation of the DT is based on a series of evaluation criteria and its overall scientific merit. Indicatively, some of the questions evaluated are the following:

- Is the research question and its significance in science described?
- Is the purpose of the research presented?
- Are the research framework and methodology briefly mentioned?
- Are research findings summarized?
- Is the significance of the research question and research motivation clearly presented?
- Is the research question connected to the existing literature?
- Is there a need for further investigation of the research question?
- Is the case to be investigated and the objective of the work clearly presented and described?
- Is the work relevant to the curriculum?
- Is the relevant terminology understood by the student and is it used correctly?
- Has the content and organization of the literature review been clearly presented?
- Is the literature cited relevant to the research question?
- Does the review analyze, synthesize, compare and evaluate relevant research?
- Is the specific methodology adequately justified concisely and clearly?
- Is the entire research summarized in a comprehensible manner, its main points stated and the main conclusions presented pointing out any restrictions that apply?
- Are any suggestions for future research mentioned?
- Has the DT regulation as defined by the PMS been observed?
- Is the style of the write-up formal, is terminology used correctly, is repetition avoided and is it consistent?
- Is the text clear, concise and to the point with no grammatical or spelling errors?
- Does the student during the presentation of the DT show mastership on the problem that he presents? Can he answer the questions of the examining committee?

The DE is evaluated by a **three-member examination committee** made up of the supervisor and two other faculty members or lecturers at the program as the valid regulations describe. The student must present the DE before the examining committee.

Use of Information and Communications technology

Yes

Teaching Methods

For each thesis there is one supervisor that has to guide the student for any problem that may occur, provide additional help on the bibliography but also supports the student during all the period.

PART III: INFORMATION FOR THE STUDENTS

GENERAL STUDENT INFORMATION

The Athens University of Economics and Business provides not only high-quality education but also high-quality student services. The adoption of the Presidential Decree 387/83 and Law 1404/83 defines the operation, organization, and administration of Student Clubs at Universities, which aim at improving the living conditions of the students and enhance their social and intellectual wellbeing through engagement and socialization initiatives.
To fulfill this objective the University ensures the required infrastructure for housing, meals, and sports activities through the operation of a student restaurant, reading rooms, library, organization of lectures, concerts, theatrical performances, and excursions in Greece and abroad. Further in this context, the University supports the development of international student relations, organizes foreign language classes, computer/software literacy classes, and courses in modern Greek as a foreign language for foreign students and expatriated Greek students.
Detailed information on meals, housing, fitness, foreign languages, cultural activities, scholarships, financial aid, is provided on the website of AUEB's Student Club at https://lesxi.aueb.gr/

Electronic Services

A significant number of procedures related to both attendance and student care are carried out electronically through applications of the University or the Ministry of Education and Religious Affairs. All applications are accessible with the same codes (username & password).

- **E-mail account:**

Detailed instructions for using the Webmail Service are provided at https://www.aueb.gr/el/content/webmail-manual

- **Electronic Secretariat (Student Register)**

The Electronic Secretariat application is the information system through which students can be served by the Department's Secretariat via the web.

- **Wireless network**

Using their personal codes, students have access to a wireless network in all areas of the Athens University of Economics and Business buildings/campus.

- **E-Learning Platform – ECLASS**

The Open eClass platform is an integrated Electronic Course Management System and is the proposal of the Academic Internet (GUnet) to support Asynchronous Distance Education Services.
Instructions are provided at https://eclass.aueb.gr/info/manual.php

Medical Services, Insurance / Healthcare

Undergraduate, postgraduate and PhD students at the University who have no other medical and hospital care are entitled to full medical and hospital care in the National Health System with coverage of the relevant costs by the National Health Service Provider. A psychiatric counseling service also operates at the University, staffed with a physician specializing in the treatment of mental health issues.
More information at https://www.aueb.gr/en/content/health-care .

Services/Facilities to Students with Special Needs

The Athens University of Economics and Business ensures the facilitation of students with special needs, through the design, implementation, and environmental adaptations, for access to the university building facilities. In the main building there are specially configured lifting machines, ramps, and elevators. There are also special regulations for conducting exams for students with special needs.
The Athens University of Economics and Business has established a Committee for Equal Access for people with disabilities and people with special educational needs. The Commission is an advisory body and submits recommendations to the competent bodies for the formulation and implementation of the policy of equal access for persons with disabilities and persons with special educational needs.

Through the Library services, students with physical disabilities are granted electronic access to the recommended Greek bibliography of the courses taught at the University. In this context, the Association of Greek Academic Libraries (SEAB) has developed a multimodal electronic library called AMELib.
More information is available at https://www.aueb.gr/el/lib/content/amea-atoma-me-idiateires-anages.

Library and Study Rooms

The Library & Information Center of the University operates at the University's main building. The AUEB Library is a member of the Hellenic Academic Libraries Association (Heal-LINK), the European Documentation Centers Europe Direct and the Economic Libraries Cooperation Network (DIOBI).
Three Documentation Centers operate within the library:

- The European Documentation Center
- The Organization for Economic Cooperation and Development (OECD) Documentation Center
- The Delegation Center of the World Tourism Organization (WHO)

The library contributes substantially both to meeting the needs for scientific information of the academic community and to supporting studying and research. The library provides access to:

- printed collection of books and scientific journals,
- course books used in modules,
- collection of electronic scientific journals& books
- postgraduate theses and doctoral theses that are produced in Athens University of Economics and Business and deposited in digital form at the PYXIDA institutional repository
- sectoral studies
- statistical series by national and international organizations
- audiovisual material
- information material (encyclopedias, dictionaries)
- databases on the topics used by the University
- printed collections of other academic libraries

The library lends all its printed collections, except for magazines and statistical series, in accordance with its internal rules of operation. The Library and Information Center offers reading rooms,

computer workstations for visitors, photocopiers and printing machines, and interlibrary loan of books and journal articles from other academic libraries that are members of its network. More information at https://www.aueb.gr/en/library .

International Programs and Information on International Student Mobility

Athens University of Economics and Business is actively involved in the Erasmus+ Program since 1987 promoting cooperation with universities, businesses, and international organizations of the European Union (EU) as well as in the mobility of students, teaching, and administrative staff.
In addition, strengthening its internationalization objectives, it creates new opportunities through the Erasmus+ International Mobility Program. Within this framework, mobility scholarships are granted through the State Scholarships Foundation (SSF) to incoming and outgoing students of the three study cycles, according to the funding approved each year by the State Scholarship Foundation for the University. Outgoing students have the possibility to spend a period of study at a Partner Institution outside the EU with full academic recognition through the application of the ECTS credits system https://www.aueb.gr/en/content/erasmus-programme

Connecting with the Job Market and Entrepreneurship

D.A.STA.O.P.A. (https://www.aueb.gr/el/dasta) is the administrative unit of the University that plans, coordinates and implements the actions of the Athens University of Economics and Business in the following areas:

a) development of entrepreneurship and innovation

b) connecting students and graduates with the labor market

c) connecting the academic community with businesses

d) student internship programs and,

e) supporting research utilization actions

Student Associations

Various student clubs and associations are active within the community of the Athens University of Economics and Business

(https://www.aueb.gr/el/content/student-associations).

Alumni Network

Adhering to a long tradition of educating future top executives in the economic, social, and political life of the country, AUEB is proud that thousands of its graduates hold leading positions in companies, organizations, research institutes and universities in Greece and abroad. Understanding the importance of developing and strengthening the bond with its graduates, AUEB created its Alumni network including a platform https://alumni.aueb.gr where all graduates of the University can

register. The main objectives of the Network are the connection of the graduates with their colleagues and former fellow students, and diffusion of information about activities, services, and events in and around the University that concern them.
Additional information on Clubs and Alumni Associations is available on the website https://www.aueb.gr/el/content/organizations-and-associations-of-students-and-alumni.

Volunteer Program

Within the framework of its strategies, the "AUEB Volunteers" Volunteering Program was launched in September 2017. The aim of the Program is to highlight important social issues and the value of participation and practical contribution, but also to raise community awareness regarding the 17 UN Sustainable Development Goals. Actions are developed around two pillars: (a) actions addressed to AUEB's Community, which have as their main objective the maintenance of the quality of the University's infrastructure based on their aesthetics and functionality, and (b) actions addressed to Greek society. (https://auebvolunteers.gr/).

Quality Assurance

The Athens University of Economics & Business implements a quality assurance policy to continuously improve the quality of its study programs, research activities and administrative services, and upgrade the academic and administrative processes and the University's operations. The Quality Assurance Unit (MODIP) operating at AUEB coordinates and supports evaluation processes. Particularly the quality assurance of the educational process is achieved using the module/teaching evaluation questionnaire completed by AUEB students. (https://aueb.gr/modip).

Training and Lifelong Learning Center

The Center for Training and Lifelong Learning **(KEDIVIM)** is an AUEB unit which ensures the coordination and interdisciplinary cooperation in the development of training programs, continuing education, training and in general lifelong learning, which complement, modernize and/or upgrade knowledge, competences, and skills, acquired from formal education, vocational education and initial vocational training systems or from work experience, facilitating integration or reintegration in the labor market, job security and professional and personal development.
(https://www.aueb.gr/el/content/dia-vioy-mathisi-kedivim-opa).