



UNIVERSITY OF THE AEGEAN

DEPARTMENT OF STATISTICS AND
ACTUARIAL – FINANCIAL MATHEMATICS



STUDENT GUIDE

ACADEMIC YEAR
2005-2006

KARLOVASSI – SAMOS



ΥΠΟΥΡΓΕΙΟ ΕΘΝΙΚΗΣ ΠΑΙΔΕΙΑΣ ΚΑΙ ΘΡΗΣΚΕΥΜΑΤΩΝ
ΕΙΔΙΚΗ ΥΠΗΡΕΣΙΑ ΔΙΑΧΕΙΡΙΣΗΣ ΕΠΕΑΕΚ



ΕΥΡΩΠΑΪΚΗ ΕΝΩΣΗ
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UNIVERSITY OF THE AEGEAN

**DEPARTMENT OF STATISTICS AND
ACTUARIAL – FINANCIAL MATHEMATICS**

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GENERAL INFORMATION

University of the Aegean



The University of the Aegean is one of the most recent Greek Universities since it was founded in 1984. The renowned Greek mathematician Constantine Caratheodory initially envisioned its foundation in the early 20th century.

The University aims at providing highly advanced education and cutting-edge research establishing new paths of knowledge. The University of the Aegean stimulates the spiritual powers of the Aegean Sea, transforming it to an archipelago of Science, Education, Culture, Creation and Cooperation.

It is a University-network focusing on the student, the young scientist and the citizen of the future.

SCHOOLS AND DEPARTMENTS

Currently, the University of the Aegean comprises of the following Schools and Departments:

a. On the island of Samos

School of Sciences, with the following Departments:

- Department of Mathematics
- Department of Information and Communication Systems
- Department of Statistics and Actuarial - Financial Mathematics

b. On the island of Lesbos

School of Social Sciences, «Benjamin of Lesbos», with the following Departments:

- Department of Environmental Studies
- Department of Social Anthropology

- Department of Sociology
 - Department of Geography
 - Department of Cultural Technology and Communication
- and the independent Department of:

- Marine Sciences

c. On the island of Chios

School of Management and Administration, with the following Departments:

- Department of Business Administration
- Department of Shipping, Trade and Transport
- Department of Financial and Management Engineering

d. On the island of Rhodes

School of Hellenic and Mediterranean Studies, with the following Departments:

- Department of Primary Education
- Department of Science and Pre-School Education
- Department of Mediterranean Studies

e. On the island of Syros

- Department of Graphic Arts and Systems Design

Administration

The Administration of the University of the Aegean is the following:

Rector: Socrates Katsikas

Vice Rectors: Ioannis Seimenis
(*Financial Planning and Development*)

Nikolaos Litinas
(*Academic Matters and Personnel*)

Sofia Dascalopoulou
(*Student Matters and International Affairs*)

Buildings

In the Aegean islands, there is an abundance of buildings of great historical and architectural value. The University of the Aegean takes advantage of this wealth and contributes to the preservation of our national heritage. The University buildings are given below:

At Samos

Municipality of Karlovassi:

- Building of the School of Commerce (School Buildings, Information Center)
- Building 'Liberi' (Offices of Professors, Secretariat)
- Building 'Provatari' (Offices of Professors, Seminar room)
- Princely Mansion (Offices of Professors, Secretariat)
- Chatjgiannio (Library)
- Storehouses 'Kalatzi' (Under formation)
- Building 'Vourlioti' (Offices of Professors, Secretariat)
- Tampakika (Under formation the most of the buildings of this block)

Municipality of Bathi:

- Maniakio Institute (Seminar room, Offices of Professors)

At Mytilene (Lesvos)

- Komninakio Primary School
- Mpinio building
- ATE building

At Chios

- Michalio Orphanage
- Karadios School
- Building of the School trusteeship (former OAED)

At Rhodes

- Building of the old barracks

At Syros

- 1st High School of Syros (Under formation)



Building of Commercial School



Princely Mansion

Administrative Headquarters

The University's Administrative Headquarters are located at:

Mytilene - Lesvos (University's Headquarters – Rector's Office):

Charilaou Trikoupí and Phaonos, Mytilene, GREECE - 81100

Tel. (22510) 36000

Fax: (22510) 36099

Samos:

Karlovassi, Samos, GREECE - 83200

Tel: (22730) 82000 - fax: (22730) 82009

Library: (22730) 82030 - fax (22730) 82039

Computer Services – School Buildings (at the building of the Commercial School)
(22730) 82040 - fax (22730) 82049

Multimedia Lab: (22730) 82060 - fax: (22730) 82069

Chios:

Michalon 8, Chios, GREECE - 82100

Tel. (22710) 35000

Fax: (22710) 35099

Rhodes:

Democratias Avenue, Rhodes, GREECE - 85100

Tel. (22410) 99000

Fax: (22410) 99009

Athens:

30 Boulgaroktonou St., Athens, GREECE - 11472

Tel. (210) 6492000

Fax: (210) 6492099

For more information about
the University of the Aegean
please visit our web site:

<http://www.aegean.gr>



Department of Statistics and Actuarial - Financial Mathematics



The Department of Statistics and Actuarial - Financial Mathematics aims at providing various skills and at developing advanced research in the areas of Statistics and Actuarial Science. The educational program of the Department aspires to produce professionals, who will be able to use sophisticated mathematical, probabilistic, statistical and computational methods in order to estimate risks and to propose efficient insurance, statistical and financial plans.

The graduates will be able to suggest optimal investment strategies. They will have the necessary background that will enable them to analyze data from health, insurance, demography, industry. They can be employed in various positions in public enterprises, ministries, banks, hospitals, insurance-finance companies, oil companies, telecommunications companies, informatics companies, advertising companies, universities, research institutes.

Finally, the Department of Statistics and Actuarial - Financial Mathematics offers post-graduate courses at the M.Sc or Ph.D level in one of the following disciplines:

- ▶ Statistics and Data Analysis
- ▶ Actuarial Mathematics – Financial Mathematics

The profession of an Actuary

An actuary is a professional who estimates financial risks. She/He uses Mathematics, Probability theory, Statistics and Economics to study uncertain events in the future, especially those concerned with insurance and pension programs. Furthermore, she/he is able to propose investment policies and to design insurance or financial programs. Moreover, she/he analyses the necessary data in order to estimate the probability of an accident, an illness, a death or a physical disaster. Finally, she/he is able to predict the profits or losses of an enterprise. An actuary can be better regarded as a “businessman” with a mathematical background rather than a “pure” mathematician.

Working conditions of an actuary are exceptional. Her/His salary is much higher than the average salary of a degree holder. In the 1988 and 1995 issues of Les Krantz’s Jobs Rated Almanac (Wall-Street Journal Edition) 250 different professions are compared. The comparison was based on the following factors:

- Wages
- Quality of Conditions
- Professional Safety
- Stress
- Physical hardship

The survey concluded, that the profession of an actuary was classified as the best among the 250 professions. The degree of an actuary is obtained by the Actuary Unit of Greece after the carrying out of relative exams that are held by the Unit.

The profession of a Financial Consultant

A financial consultant provides advice to her clients with regard to their financial planning or to the management of their financial assets so that they can realize their financial goals. The clientele of a financial consultant ranges from individuals to small and medium enterprises, large corporations, non governmental organisations or even to governments (that may need for example the restructuring of their debt or the privatisation of public companies or the financing of large scale projects).

It is therefore obvious that there is a wide range of projects that a financial consultant may deal with, like for example investments, risk management, IPOs, debt issues, mergers and acquisitions, restructuring projects etc. A financial consultant may work either as an independent consultant or as a team member of a consulting company or a financial organisation.

Apart from a good educational background, a financial consultant needs to keep up to date with new financial products, methods and trends, have good analytical, problem solving, organisational and communication skills, creative thinking, business mindness, team and cooperative spirit and the ability to inspire confidence and trust.

The profession of a Statistician

A statistician can be employed under very favorable prospects in the public and private sector. In the private sector there are many well-paid positions for statisticians particularly in banks, market research companies, insurance companies, telecommunication business, oil and advertisement companies. The role of the statistician in these companies is highly significant and their consulting is extremely useful. In the public sector there are Statistics Departments in ministries and public organizations, where statisticians analyze data using statistical packages, reaching useful conclusions.

Furthermore, a Statistics graduate with an emphasis in biostatistics can be employed in the pharmaceutical industry or in hospitals. Statisticians working in hospitals and health authorities are involved in the design and analysis of clinical studies, in monitoring mortality and in health care provision. It is emphasized that statistical inference is crucial in health and

medicine where there is a shortage of biostatisticians.

In academic Institutions (Universities, Polytechnics, Research Institutions), a Statistics graduate can apply for an advanced research degree. She/He can work on a theoretical or an applied topic in Statistics.

Many statisticians participate in various research programs that are supported financially by the European Union.

Registration Information

Student registration takes place two weeks after the opening of the winter semester. During the registration, the student has to decide upon the courses that she/he will attend. Incoming students are welcomed during a special daily meeting. This meeting aims at informing first year students about the basic objectives of the Department of Statistics and Actuarial - Financial Mathematics as well as about life in Samos. Furthermore, it encourages communication with the other members of the campus. The program of the meeting includes: analysis of the syllabus, study regulations and a detailed presentation of first semester courses.

Academic and administrative staff

Chair of the Department **Socrates Katsikas**

Professor of the Department of Information and Communication Systems Engineering, Rector of the University of the Aegean.

Faculty

- **Yannacopoulos Athanassios**, Associate Professor (*Random and Deterministic nonlinear Dynamic Systems, Stochastic Analysis, Financial Mathematics*)
- **Konstantinides Dimitrios**, Assistant Professor (*Actuarial Mathematics, Financial Mathematics, Risk Theory*)
- **Milionis Alexandros**, Assistant Professor (*Time –Series, Econometrics*)
- **Nicoleris Theodoros**, Assistant Professor (*Bayesian Nonparametric Statistics, Decision Theoretic Methods*)

- **Georgiou Stelios**, Lecturer (*Experimental Design*)
- **Halidias Nikolaos**, Lecturer (pending appointment) (*Differential Equations, Nonlinear analysis and applications*)
- **Hatjispyros Spyros**, Lecturer (pending appointment) (*Dynamic systems, statistical software*)
- **Hatzopoulos Petros**, Lecturer (*Life Insurance Theory, Actuarial Statistics*)
- **Maravelakis Petros**, Lecturer (pending appointment) (*Quality Control – Reliability Theory – Categorical Data Analysis*)
- **Nakas Christos**, Lecturer (*Biostatistics, Survival Analysis, Multivariate Statistical Analysis*)
- **Zimeras Stylianos**, Lecturer (*Probability, Statistics, Image Processing*)

Adjunct faculty (2004-2005)

- **Koutsobinas Theodoros**, Assistant Professor (*Monetary Macroeconomics*)
- **Hatzinikitas Agapitos**, Assistant Professor (*Applied Mathematics, Mathematical Physics*)
- **Poufinas Thomas**, Assistant Professor (*Financial and Actuarial Mathematics, Information Theory and Statistics*)
- **Andritsakis Apostolos**, Lecturer (*Insurance Theory*)
- **Oikonomou Maria**, Lecturer (*Actuarial Mathematics – Pension funds*)
- **Papageorgiou Efstathia**, Lecturer (*Probability - Statistics*)
- **Paparodopoulos Nicolaos**, Lecturer (*Actuarial Mathematics*)
- **Papatheodorou Panagiotis**, Lecturer (*Political Psychology - Communication*)
- **Tahtsis Eleftherios**, Lecturer (*Set theory*)
- **Xanthopoulos Stylianos**, Lecturer (*Financial Mathematics*)

Technical and Lab support

- **Mamzeridou Eftychia**, M.Sc in Statistics

The web site of our Department

The Department of Statistics and Actuarial-Financial Mathematics has its own web site, which is:
<http://www.actuar.aegean.gr>

MORE INFORMATION - USEFUL TELEPHONE NUMBERS

Departmental Head Secretary Kyriakou Photis	22730-82015
Secretary of Undergraduate Studies Antoniou Niki, Mitropoulou Elina	22730-82024
Secretary of Postgraduate Studies Tsesmeli Nikoleta	22730-82012
Administrative Service Karagianni Popi	22730-82118
Telephone Center of the School of Sciences Katsiani Manto	22730-82000
Central FAX of the School of Sciences	22730-82009
Departmental Administrative Head Papagrigoriou Eleni	22730-82017
Technical Support Zakinthinos Argyris	22730-82013
Financial Services - Accounting Kyriakou Photis	22730-82015
Careers Office Tsesmeli Nikoleta	22730-82012
Library	22730-82030
Computing Center	22730-82040
Fire Protection	199
Departure of Information Technology and Communication Support - Samos	22730-82166
Police Station	22730-32444
Port Authority	22730-30888
Health Center of Karlovassi	22730- 32222 – 32266
Hospital of Samos	22730-83100
Olympic Airlines	
Central Offices (Reservations)	210-9666666
Samos	22730-23927
Airport of Samos	22730-61219

PROGRAM OF STUDY

For every course, its syllabus, its code, weekly teaching hours and academic status are reported.

- [C] Compulsory courses
- [CS] Compulsory courses for the Statistics major
- [CA] Compulsory courses for the Actuarial and Financial major
- [E] Elective courses

CORE COURSES

SEMESTER A

B₁	Calculus I	(6) [-C-]
	Convergence of sequences, functions, continuity, derivatives, fundamental theorems of calculus, L' Hospital's rule, Taylor's theorem, introduction to integration, definite and indefinite integrals, calculation of integrals, generalized integrals, special functions (the beta and gamma function), applications using the software package Mathematica.	
B₂	Linear Algebra	(6) [-C-]
	Linear spaces and subspaces, dimension, matrices, systems of linear algebraic equations, linear operators, determinants and applications, Cramer's rule, eigenvalues and eigenvectors, applications using Mathematica.	
B₃	Introduction to Computer Science	(6) [-C-]
	Introduction and basic definitions of Information Systems. Description of PC's basic elements. Fundamentals of operating systems (DOS, Windows, Unix). Basic forms, indices, variables and functions.	
B₄	Introduction to Insurance	(3) [-C-]
	Brief historical overview. Risk management methods. Basic insurance notions. Types of insurance. Insurance policies and insurance contracts. Mathematical and economic foundations of insurance. Calculation of premiums and other insurance variables. Insurance and national economy. Insurance and finance. Reinsurance and international aspects of insurance.	
B₅	Introduction to Probability Theory and Statistics	(6) [-C-]
	Theory: Combinatorics, finite sample space, basic properties of probability, examples of discrete and continuous distributions, descriptive statistics, Bayes theorem, independent events, probability and cumulative distribution functions.	
	Lab: Descriptive statistics through the use of Minitab, Excel and SPSS.	
B₆	English I	(3) [-C-]
B₇	Physical Education	[-E-]

SEMESTER B**B₈ Calculus II (6): [-C-]**

The Riemann integral. Mean value theorem. Integration techniques. Number sequences. Sequences of functions. Power series. Multiple integrals. Applications using the software packages Mathematica and Mablabs.

B₉ Probability Theory I (6): [-C-]

Examples of discrete and continuous random variables (Binomial, Bernoulli, geometric, negative binomial, hypergeometric, poisson, uniform, exponential, gamma, beta, normal, cauchy, t, F, weibull, pareto, log-normal). Expected value and variance of common distributions. Moment generating functions.

B₁₀ Introduction to Financial Mathematics (3) [-C-]

Theory of interest, present value, accumulated value. Due, immediate and deferred annuities, perpetuities. Variable annuity methods (including Laplace transform and difference methods). Equations of value and common measures of yield. Loans, amortization, sinking funds, arbitrary loan repayment schemes. Bonds and debentures, premium and discount, callable bonds, serial bonds.

B₁₁ Statistics I (6) [-C-]

Useful notions of probability theory and related distributions. Sufficiency and exponential family of distributions, completeness. Point estimation: Mean square error and unbiasedness. Uniformly minimum variance unbiased estimation. Fisher information. The Cramer –Rao lower bound and efficiency of estimators. The method of maximum likelihood. Asymptotic theory of the maximum likelihood estimates. The Delta method. Confidence intervals.

B₁₂ Macroeconomics (6) [-C-]

National product, GNP and GDP, Keynes theory, consumption, savings, average and marginal propensity to consume-save, linear and non-linear functions of consumption and savings, unemployment, income theory, income multiplier, investment theory, fiscal policy, inflation.

B₁₃ Communication – Theory Methods and Communication Techniques (3) [-C-]

Communication as semeiology and exchange of messages. Communicational Models, Institutionalization and systems. Principal psychological mechanisms in the process of communication. Communication, group psychology and public opinion. Propaganda strategies and suggestion of messages. Psycho-political technology and mass communication. Techniques of creative writing and the structure of scientific papers.

B₁₄ English II (3) [-C-]**B₁₅ Physical Education [-E-]****SEMESTER C****B₁₆ Calculus III (3) [-C-]**

Functions of many variables, partial derivatives, critical points, critical points under constraints, elements of complex variable theory, applications using the software packages Mathematica and Matlab.

B₁₇ Probability Theory II (6) [-C-]

Probability generating functions, characteristic functions, vector random variables, joint distributions, co-

variance, conditional distributions, statistical inequalities, sequences of random variables, modes of convergence, laws of large numbers (weak and strong versions), Borel-Cantelli Lemmas, order statistics.

B₁₈ Statistics II (6) [-C-]

Theory: Sampling distributions, t , X^2 , F . Testing of statistical hypotheses. The Neyman- Pearson lemma. Maximisation of power of a test. Uniformly most powerful tests. Composite null hypotheses and the monotone likelihood ratio property. Maximum likelihood ratio tests, asymptotic theory. Nuisance parameters and generalised likelihood ratio tests. Confidence intervals. Examples, duality between confidence intervals and hypothesis testing. Bayesian inference: Subjective and objective probability, a-priori and a-posteriori distributions. Conjugacy. Decision theory. Admissible and minimax rules. Bayes' rules and Bayes' risk. Classification and hypothesis testing.

Lab: Application through the use of statistical packages.

B₁₉ Numerical Analysis and Programming (6) [-C-]

Theory: Introduction to programming with C and C++. Gauss elimination. LU and Choleski factorization. Stability of linear systems. General relaxation methods. Methods of Jacobi and Gauss - Seidel. Numerical calculation of eigenvalues - eigenvectors. Lagrange, Hermite and spline interpolation. Chebyshev polynomials. Weierstrass theorem. Numerical Integration. Root finding. Solution of non-linear systems. Numerical solution of differential equations. Taylor and Runge-Kutta methods.

Lab: Numerical methods in C and C++.

B₂₀ Stochastic Processes I (3) [-C-]

Finite space. Markov processes. Discrete Markov processes. Classification of states of Markov processes. Stationary distribution of a Markov process. Poisson Processes. Compound Poisson Processes. Birth death processes. Renewal processes. Random walks. Introduction to queuing theory.

B₂₁ Communication – Theory Methods and Communication Skills (3) [-C-]

Risk Society. Venture, danger and uncertainty. Personal relations, subject, self and society in the late modern age. Social constructivism, discourse and risk. Internet and risk. Risk Society and globalization. Decision-making in the institutional and administrative environment. Techniques of skillful and competent verbal communication.

B₂₂ English III (3) [-C-]

B₂₃ Physical Education [-E-]

SEMESTER D

B₂₄ Introduction to Real Analysis (6) [-C-]

Uniform continuity of functions sequences of functions pointwise convergence and uniform convergence. Series of functions and criteria for uniform convergence. Uniform convergence of power series in closed and bounded intervals. Riemann-Stieltjes integral Algebras of sets, σ -algebras.

B₂₅ Ordinary Differential Equations (3) [-C-]

Problems involving differential equations, separation of variables, homogeneous equations, linear differential equations, Bernoulli, Riccati, complete, Clairaut and Lagrange differential equations, Euler multiplier, point transformations. Picard-Lindlof theorem, linear equations of order n , Wronskians, the method of La-

grange, Euler equations, linear equations with constant coefficients laplace transforms, the Frobenious method. Introduction to the partial differential equations. Applications using Mathematica and Matlab.

B₂₆ Regression Analysis (6) [-C-]

Theory: Simple and linear model. Least square method. Estimation – γ coefficients. Conditions of linear model. Residuals. Diagnostic methods. Residual selection techniques (stepwise regression e.t.c.). Analysis of variance and covariance.

Lab: Applications through the use of statistical pachages.

B₂₇ Stochastic Processes II (6) [-C-]

Brief review of the axiomatic approach to probability. Review of basic concepts such as convergence, conditional expectations etc. Introduction to martingales (definition, examples, optional stopping theorems) with applications. Wiener processes (definition, martingale properties, characterization - Levy's theorem – Markov property, reflection principle). Introduction to diffusion processes (principles of stochastic integration and Ito processes). Levy processes

B₂₈ Microeconomics (3) [-C-]

Instruments of economic analysis. Markets, supply and demand. Consumer behavior and producer behavior. Market structure, production costs and competition. Uncertainty, economics of risk. Public sector, welfare.

B₂₉ Physical Education [-E-]

ACTUARIAL AND FINANCIAL MAJOR

SEMESTER E

A₁ Financial Mathematics I (6) [-CA-]

Brief general introduction to concepts of finance (markets, securities, portfolios, interest rates etc). Introduction to the theory of choice under uncertainty (expected utility, Arrow-Pratt risk measures). Brief introduction to the theory of general equilibrium. One period market models – the Arrow Debreu model (arbitrage, Arrow-Debreu measure and its use in asset pricing, completeness). Examples Multi-period market models (discrete time, discrete and finite states of nature). Generalization of the concepts that were introduced in the case of one-period models. Introduction to the concept of equivalent martingale measure. Examples. Basic applications of the theory to the pricing of contingent claims (e.g. derivatives)

A₂ Life Insurance (6) [-CA-]

Basic notions. Life insurance and financial planning. Types of life insurance, life insurance riders. The insurance policy and underwriting. Claim settlement procedures. Insurance portfolio administration. Disability and health insurance. Group life, employee benefit plans.

A₃ Mathematics of Life Insurances I (6) [-CA-]

Life tables and survival functions, force and other indices of mortality. Principles of premiums estimation and single net premiums. Types of individual life insurance. Life annuities. Total loss, mathematical and gross premiums. Mathematical reserves, gain and loss analysis, modified reserves, operations and modifications of insurance contracts, profit testing procedures.

- A₄ Operations Research** (3) [-E-]
 Linear programming. Simplex methods. Non - linear programming. Logistics. Queues. Introduction to graph theory
- A₅ Investments (331-3150)** (3) [-E-]
 Review of risk and return. Effective markets and information. Portfolio theory, investment strategies, technical analysis. Credit analysis, use of derivative products. Measurement of investment performance.
- A₆ Introduction to the Social Thought I** (2) [-E-]
 Modern society and individuals position within it. A review of the process of birth of modernity, its fundamental characteristics, its emergent problems and its future potential. An introduction to the contexts of modern collective life.
- A₇ Introduction to Law** (2) [-E-]
- A₈ French I** (3) [-E-]

SEMESTER F

- A₉ Financial Mathematics II** (6) [-CA-]
 Applications of the general theoretical framework developed in Financial Mathematics I for the pricing of certain financial products. Options. The binomial model for European and American options. Bonds and models for pricing them in discrete time. The Markowitz model in portfolio theory. The capital asset pricing model (CAPM), measures for risk and return of investments. Portfolio choice theory, mean variance portfolios, hedging. Principles of asset management.
- A₁₀ General Insurance** (6) [-CA-]
 Basic risk management principles. Insurance principles, insurability. The insurance contract and legal aspects. Property insurance, casualty insurance, liability insurance. Fire and allied perils insurance, homeowner's insurance, motor vehicle insurance. Marine and cargo insurance. Liability insurance (personal, professional, product).
- A₁₁ Mathematics of Life Insurances II** (6) [-CA-]
 Special benefits and variable products (with emphasis on unit linked). Multiple life insurance (joint-life status, last-survivor status, general symmetric status, compound and special contingent statuses, reversionary annuities). Multiple-decrement models (multiple decrement tables, absolute rate of decrement, associated single decrement tables). Population theory. Multiple state theory. Martingale applications.
- A₁₂ Bayesian Statistics** (6) [-CS-][-CA-]
 Subjective probability, Bayes rule, conjugate and non informative distributions, Maximum Likelihood principle, Lindley's paradox, regression analysis, introduction to Markov Chain Monte Carlo.
- A₁₃ Risk Measurement and Management** (3) [-E-]
 Measurement and management of financial risk, portfolio risk, risk associated with financial products.
- A₁₄ Mortality analysis** (3) [-E-]
 Estimation of crude mortality rates, construction of mortality table, graduation, comparison of mortality ex-

periences, construction of multiple decrement table, construction of abridged Table.

A₁₅ Accounting (3) [-E-]

Introductory Concepts. Balance Sheets. Registration of Accounting Events. Fixed Assets. Circulating Assets. Special Topics on Books Close. Accounting Information Cycle. Liquidity Ratios. Balance Sheet Interpretation with Profitability, Efficiency and Capital Structure Indices.

A₁₆ Introduction to the Social Thought II (2) [-E-]

Ways that collective organization of society is formed and its functions. Our dual existence as individuals with personal identity and as members of collective formations in multiple levels which form their own 'systemic' identity. The relation of individual with the social collectivities she/he belongs to and interacts with. The approach of social sciences in the matter of collective action and societies' functions. The concept of social systems as a method of approach to social collectivities.

A₁₇ Gender and Employment (2) [-E-]

A₁₈ French II (3) [-E-]

SEMESTER G

A₁₉ Financial Mathematics III (6) [-CA-]

This course consists of a generalization of the theory of financial mathematics in continuous time. Review of martingales and Wiener processes. Market models based on the Wiener process (geometric Brownian motion, mean reverting processes). Arbitrage and completeness. Equivalent martingale measures, risk neutral measures, change of measure using Girsanov's theorem. Self financing portfolios. Option pricing using the Black-Scholes model – Black –Schoels equation. Pricing of American Options. Introduction to the theory of stochastic control and applications in portfolio selection.

A₂₀ Risk Theory I (6) [-CA-]

Premium calculation principles with emphasis on the utility principle, risk aversion. Partial insurance coverages, optimality of excess loss. Individual model for aggregate claims, safety margin, normal and compound Poisson approximations. Collective risk model, convolution methods and moment generating function (or Laplace transform) methods. Compound and compound mixed distributions. Recursive methods for the calculation of aggregate claims. Stochastic processes, operational time, contagion models. The surplus process, the adjustment coefficient, the probability of ruin, random variables relating to the surplus.

A₂₁ General Insurance Mathematics (6) [-CA-]

Types of coverages, limits, deductibles. Exposure to risk, frequency and severity, inflation and other trends. Rating factors, credibility methods, premium calculation. Risk classification methods, bonus-malus systems. Loss reserving methods, allocated and unallocated loss adjustment expenses. Credibility theory, full and partial credibility, Buhlmann and Buhlmann-Straub models. Other models, Bayes credibility, use of loss functions. Time series methods, Kalman filters.

A₂₂ Computational Statistics – Simulation Techniques (6) [-CA-] [-CS-]

Simulation techniques, random number generators, Box-Muller method, Markov chains, Gibbs sampler, Metropolis algorithm. Simulation software, statistical analysis of simulation results. Basic definitions, plug-in

principle, correlation among bootstrap, jackknife and cross validation, nonparametric solutions, confidence intervals and hypotheses testing.

A₂₃ Time Series (6) [-CS-] [-CA-]

Correlated variables, types of smoothing, ARIMA models, estimation techniques (Box and Jenkins, filtering, etc.), forecasting and computer applications.

A₂₄ International Financial Markets (3) [-E-]

Exchange markets, exchange rates derivatives on exchange rates, international bond markets

A₂₅ Solvency Testing (3) [-E-]

The insurer's technical result. Expenses, investment income, and the insurer's final result. The surplus process and solvency reserves. Profit testing at the product level and at company level. Notion of capital at risk, static methods of determining solvency. Sensitivity analysis, resilience tests, risk based capital methods. Dynamic solvency methods, stochastic methods, simulation.

A₂₆ Marketing (3) [-E-]

Analysis of marketing opportunities (management of marketing information, scanning of the marketing environment, analysis of markets and consumer behavior, competition analysis, market segmentation and selection of target markets). Development of marketing strategies (differentiating and positioning, development of new products, designing marketing strategies).
Planning marketing programs (managing products, managing services, designing pricing strategies, selecting and managing marketing communications, managing sales channels). Managing the marketing activities.

A₂₇ Introduction to Partial Differential Equations (3) [-E-]

Elliptic and Parabolic problems, Fourier series and the method of separation of variables. Numerical solution of Elliptic and Parabolic problems.

A₂₈ Special topics of Microeconomical theory (3) [-E-]

A₂₉ Development of Entrepreneurial Skills I (2) [-E-]

A₃₀ English – Toefl [-E-]

SEMESTER H

A₃₁ Risk Theory II (6) [-CA-]

Ruin theory, Lundberg inequality, Cramer-Lundberg formula. Renewal equations and Laplace transform methods. Right tail methods, asymptotic results, bounds and approximations. Applications to excess loss coverages, stop loss coverages, and reinsurance. Loss distributions, fitting to empirical data. Generalized models of the surplus process, dynamic solvency models.

A₃₂ Survival Analysis (6) [-CA-] [-CS-]

Nonparametric approaches (Life Tables, Kaplan-Meier estimation of survivor functions, Estimation of the hazard function, Comparison of two or more groups - log-rank and Wilcoxon tests). Semi-parametric approaches; the proportional hazards model (Likelihood functions; fitting the model, Residual diagnostics; Cox-Snell, martingale, deviance, score residuals, Graphical methods. Fully parametric models (Exponential, Weibull, log-logistic models). Using statistical software for survival analysis (S-plus, Minitab, SPSS).

- A₃₃ Pension Schemes (3) [-CA-]**
 Structure and design of pension funds. Basic actuarial aspects of pension plans, principal actuarial variables involved. Actuarial assumptions and actuarial cost methods, periodic gain and loss analyses. Relative merits of cost methods, sensitivity analysis. Methods of funding the cost, capitalization, pay-as-you-go. Pension fund investments. Social security principles and practices.
- A₃₄ Reinsurance (3) [-CA-]**
 Rationale and basic notions. Types of reinsurance and mathematics thereof. The reinsurance treaty and its principal clauses. Reinsurance commissions and reinsurance accounts. Reinsurance premium calculation methods. Reinsurance profitability and solvency.
- A₃₅ Stochastic Dynamic Programming (3) [-CA-]**
 Finite horizon models, Optimal policy equation, Method of successive approximations, solution using linear programming, optimal stopping problems, sequential analysis, reward maximization, stochastic scheduling.
- A₃₆ Econometrics (6) [-CS-] [-CA-]**
 Linear and non-linear models, assumptions of the linear model, LPM, Logit, Probit, Tobit models, causality test, simultaneous equations, lag-models, computer applications to real data.
- A₃₇ Corporate Finance (3) [-E-]**
 Use of contingent claims valuation methods in the pricing of corporate securities, optimal capital structure, dividend policies and investment decisions. Mergers and acquisitions, etc.
- A₃₈ Extreme Events Modeling (3) [-E-]**
 Norming and centering of sums of i.i.d.r.v.'s. Stable distributions, limit property, spectral representation. Regularly varying functions, properties. Karamata's theorem. Domain of attraction of a stable distribution. Central Limit Theorem. Domain of normal attraction, characterization. Triangle arrays, infinitely divisible laws. Convergence rate estimates in CLT. Heavy-tailed distributions. Large deviations. Brownian motion, Donsker's invariable principle, alpha-stable motion. Random sums. Gnedenko's transfer theorems. Fluctuations of maxima. Poisson approximation. Max-stable distributions. Fisher-Gnedenko-Tippett theorem. Maximum domain of attraction. Domains of attraction for the Frechet, Weibull and Gumbel distributions. The generalised extreme value distribution. Characterization of its maximum domain of attraction. Mean excess function. Generalised Pareto distribution.
- A₃₉ Economic and Financial Statistics (3) [-E-]**
 Statistical indices, statistics of the balance of payments, quality and presentation of the statistical data. Advanced topics in statistical processing of economic and financial data.
- A₄₀ Measure Theory (3) [-E-]**
 Basic definitions, Lebesgue measure, example of Lebesgue measures, Lp-spaces and convergence, Lebesgue and Riemann integral, Radon-Nikodym theorem.
- A₄₁ Communication – Practical Skills (2) [-E-]**
 This is a seminar type course. Sessions will be devoted to the development of techniques of, writing a curriculum vitae, giving interviews, presentation of results, writing research abstracts and proposals, text presentation in web pages etc.

A₄₂	Development of Entrepreneurial Skills II	(2) [-E-]
A₄₃	English – Toefl	[-E-]
A₄₄	Practical Fieldwork (331-4600)	(6) [-E-]

STATISTICS MAJOR

SEMESTER E

S₁	Statistical Packages I	(6) [-CS-]
	Introduction to SPSS, S-Plus and Matlab. Importing and exporting data, descriptive statistics, regression analysis, statistical inference (estimation, hypothesis testing) simulation.	
S₂	Sampling Theory	(6) [-CS-]
	Sampling techniques, simple random sampling, stratified sampling, cluster sampling, systematic sampling, ratio sampling, estimation of standard error, questionnaire design, regression estimation. The students will carry out a survey that best suits their needs and interests.	
S₃	Analysis of Variance and Design of Experiments	(6) [-CS-]
	Normal linear model, estimable functions, Gauss-markov property, analysis of covariance and computer applications. Latin and Greco-Latin squares, balanced and partially balanced designs, A, D, E optimality criteria	
S₄	Demography (331-3350)	(3) [-E-]
	Basic definitions, mortality rates, survival tables, de facto-de jure populations, immigration and emmigration, demographic projections and policies.	
S₅	Statistical Quality Control	(3) [-E-]
	Quality and the role of Statistics, product and process design, assessing conformance, control charts, acceptance sampling, assessing performance, reliability.	
S₆	Data Bases	(3) [-CS-]
	Basic definitions, QBE and SQL data base languages, introduction to data mining and handling data through the use of statistical software.	
S₇	Introduction to the Social Thought I	(2) [-E-]
	Modern society and individuals position within it. A review of the process of birth of modernity, its fundamental characteristics, its emergent problems and its future potential. An introduction to the contexts of modern collective life.	
S₈	French I	(3) [-E-]

SEMESTER F

- S₉ Multivariate Analysis (6) [-CS-]**
 Multivariate data, multivariate descriptive statistics, multivariate distributions, Wishard distribution, Hottelings T₂, Wilks lambda, MANOVA, principal components analysis, factor analysis, cluster analysis, discriminant analysis. Applications with the use of SPSS and S-Plus.
- S₁₀ Generalized Linear Models (6) [-CS-]**
 Inference for generalised models, Fisher scoring, binary data, logistic regression, link function probit, log-log, poisson data, log-linear models. Computer applications with GLIM and SAS.
- S₁₁ Bayesian Statistics (6) [-CS-][-CA-]**
 Subjective probability, Bayes rule, conjugate and non informative distributions, Maximum Likelihood principle, Lindley's paradox, regression analysis, introduction to Markov Chain Monte Carlo.
- S₁₂ Statistical Packages II (3) [-E-]**
 Introduction to Matlab and SAS using simulation, regression analysis and multivariate techniques. Utilizing Matlab's Statistics toolbox and IML environment in SAS.
- S₁₃ Decision Theory (3) [-E-]**
 Basic definitions, utility, risk functions, loss functions, randomized decisions, minimax and Bayesian criteria, complete and essentially complete classes, application to estimation theory and to hypothesis testing.
- S₁₄ Socioeconomic Statistics (3) [-E-]**
 The course will focus on special topics regarding research in social science and economics such as structural equation modeling, Cronbach's alpha, item response theory, hierarchical linear models for education and psychometrics.
- S₁₅ Sequential Analysis (3) [-E-]**
 Sequential decision rules, Sequential tests of a simple hypothesis against a simple alternative, Wald's identity, the sequential probability ratio test, the fundamental identity of sequential analysis. Applications in sequential estimation methods.
- S₁₆ Introduction to the Social Thought II (2) [-E-]**
 Ways that collective organization of society is formed and its functions. Our dual existence as individuals with personal identity and as members of collective formations in multiple levels which form their own 'systemic' identity. The relation of individual with the social collectivities she/he belongs to and interacts with. The approach of social sciences in the matter of collective action and societies' functions. The concept of social systems as a method of approach to social collectivities.
- S₁₇ Gender and Employment (2) [-E-]**
- S₁₈ French II (3) [-E-]**

SEMESTER G

- S₁₉ Biostatistics (6) [-CS-]**
Introduction to epidemiology, frequency measures (odds ratio, sensitivity, specificity, etc), clinical trials, randomization, protocol design, phase I, II, III and IV, sample size calculations, truncation rules, Wald's test.
- S₂₀ Time Series (6) [-CS-] [-CA-]**
Correlated variables, types of smoothing, ARIMA models, estimation techniques (Box and Jenkins, filtering, etc.), forecasting and computer applications.
- S₂₁ Computational Statistics – Simulation Techniques (6) [-CA-] [-CS-]**
Simulation techniques, random number generators, Box-Muller method, Markov chains, Gibbs sampler, Metropolis algorithm. Simulation software, statistical analysis of simulation results. Basic definitions, plug-in principle, correlation among bootstrap, jackknife and cross validation, nonparametric solutions, confidence intervals and hypotheses testing.
- S₂₂ Nonparametric Statistics (3) [-CS-]**
Estimation for distribution quantiles, tolerance limits, sign test, Wilcoxon test, Kruskal-Wallis analysis of variance, Kolmogorov-Smyrnov function, Lilliefors test, equality of two distributions.
- S₂₃ Actuarial Statistics – Risk management (3) [-E-]**
Mortality measures, hazard function, survival tables, computational methods for population size at risk, spline smoothing.
- S₂₄ Non – linear models (3) [-E-]**
Markov Chain Monte Carlo methods, hierarchical models, meta-analysis, Weibull and truncated regression.
- S₂₅ Marketing (3) [-E-]**
Analysis of marketing opportunities (management of marketing information, scanning of the marketing environment, analysis of markets and consumer behavior, competition analysis, market segmentation and selection of target markets). Development of marketing strategies (differentiating and positioning, development of new products, designing marketing strategies). Planning marketing programs (managing products, managing services, designing pricing strategies, selecting and managing marketing communications, managing sales channels). Managing the marketing activities.
- S₂₆ Development of Entrepreneurial Skills I (2) [-E-]**
- S₂₇ English – Toefl [-E-]**

SEMESTER H

- S₂₈ Econometrics (6) [-CS-] [-CA-]**
Linear and non-linear models, assumptions of the linear model, LPM, Logit, Probit, Tobit models, causality test, simultaneous equations, lag-models, computer applications to real data.
- S₂₉ Data Analysis (6) [-CS-]**
This course constitutes the culmination of applied statistical theory since the students, acting as statistical con-

sultants, have to analyze a data set and provide their suggestions and recommendations every week. The analysis will take place through the use of the appropriate statistical software and will be described in written reports and, if time permits, in oral presentations. In the final examination the students will analyze their own data set.

- | | | |
|-----------------------|--|--------------------------|
| S₃₀ | Survival Analysis | (6) [-CS-] [-CA-] |
| | Nonparametric approaches (Life Tables, Kaplan-Meier estimation of survivor functions, Estimation of the hazard function, Comparison of two or more groups - log-rank and Wilcoxon tests). Semi-parametric approaches; the proportional hazards model (Likelihood functions; fitting the model, Residual diagnostics; Cox-Snell, martingale, deviance, score residuals, Graphical methods. Fully parametric models (Exponential, Weibull, log-logistic models). Using statistical software for survival analysis (S-plus, Minitab, SPSS). | |
| S₃₁ | Modern Techniques in Forecasting and Modeling | (3) [-E-] |
| | Introduction to Kalman Filter, VAR, VARMAX, ARCH, Random Coefficient, co-integration, error-correction, neural networks, pattern recognition, application to industry. | |
| S₃₂ | Economic and Financial Statistics | (3) [-E-] |
| | Statistical indices, statistics of the balance of payments, quality and presentation of the statistical data. Advanced topics in statistical processing of economic and financial data. | |
| S₃₃ | Measure Theory | (3) [-E-] |
| | Basic definitions, Lebesgue measure, example of Lebesgue measures, L _p -spaces and convergence, Lebesgue and Riemann integral, Radon-Nikodym theorem. | |
| S₃₄ | Categorical Data Analysis | (6) [-CS-] |
| | Contingency tables, odds ratio, risk ratio, goodness-of-fit tests, log-linear models, Bayes analysis, repeated measures, matched pairs. Computer applications with GLIM and SAS. | |
| S₃₅ | Communication – Practical Skills | (2) [-E-] |
| | This is a seminar type course. Sessions will be devoted to the development of techniques of, writing curriculum vitae, interviews, presentation of results, writing research abstracts and proposals, text presentation in web pages etc. | |
| S₃₆ | An Introduction to Environmental Statistics | (3) [-E-] |
| | An elementary introduction to geophysical flows. Laminar and turbulent flow. Statistical theory of turbulence-closure problems. Statistical diffusion models – applications in atmospheric sciences and oceanography. Statistical models for air pollution. Green house effect and climatic changes (a descriptive introduction). Climatic time series and the Mann-Kendall test. Statistical persistence and applications. Statistical methods for extreme events forecasting. | |
| S₃₇ | Development of Entrepreneurial Skills II | (2) [-E-] |
| S₃₈ | English – Toefl | [-E-] |
| S₃₉ | Practical Fieldwork (331-4600) | (6) [-E-] |

Requirements for Graduation

▶ Courses

All courses during the first two years of study are **compulsory (C)** except Physical Education. In the last two years students may select courses from one of the two majors or from both of them:

- **The Actuarial and Financial major (CA)**
- **The Statistics major (CS)**

Third and fourth year students can select for credit a maximum of 3 courses from the other Departments in the School of Sciences. Each year, the Departmental Staff Assembly decides which courses can not be selected, on account of having similar content as those that are offered in our Department. The credit points for courses offered by other Departments are given at the student guide of the respective Departments.

Recommended courses from the Department of Mathematics: 1) Partial Differential Equations, 2) Functional Analysis, 3) Linear Programming, 4) Mathematical Modeling, 5) Discrete Mathematics, 6) Analysis II, 7) Dynamic Programming.

Recommended courses from the Department of Information and Communications Systems: 1) Software Design and Implementation (C), 2) Programming Methods and Languages (C++), 3) Fourier Analysis, 4) Computer Networks, 5) Databases, 6) Performance Assessment.

Every semester, students can attend a number of courses that correspond to a maximum of 39 credit points. If a student has successfully passed all of her/his exams of the previous years, then she/he could attend courses corresponding to a maximum of 45 credit points. Final year students can attend as many courses as they wish. In the aforementioned 39 or 45 credit points are not included those points that were accumulated from the English as a Foreign Language course or from the Summer Placement .

For courses offered in each semester, except the first one, students are expected to fill in a courses declaration form, which is provided electronically in the Departmental web site . This should be ready upon completion of the September examination period. Students gain access to the online registration system through a password, obtained from the Secretariat, which will be valid for all the academic semesters. Registration can be done in the main web page of the University at:

<http://www.samos.aegean.gr>

▶ English

English lessons are divided into three levels of teaching (Groups): they are compulsory and the average grade of the 2nd and 3rd levels corresponds to three credits (teaching units). It should be noted that they are done independently of the total number of the compulsory lessons that students are required to do.

Students at the commencement of the first semester, subsequent to their performance in the placement test, are allocated either to the 1st or the 2nd level. Progress to a higher level is dependent on passing the current level of English which is being followed by the student.

The 2nd and 3rd levels are compulsory for all students: without exception.

The lessons have three aims, as follows: first, to ensure that students at the end of their 2nd year of their studies are able to read English language technical articles that are related to their studies; second, to enable students to attend lectures and seminars in English; and third, to train students to be able to express their work in both written and oral English. Specifically, the allocation of hours of classroom teaching and language laboratory work are as follows:

- 1st Level: General English 2hrs, language lab 1hr, English for Mathematics 1hr.
- 2nd Level: General English 1hr, English for Economics 1hr, language lab 1hr, English for Mathematics 1hr.
- 3rd Level: General English 1hr, English for Economics 1hr, language lab 1hr, English for Mathematics 1hr.

General English includes directions in grammar and syntax which are necessary for correct speech and writing. In the case of the English for Economics, the following books are currently in use: “Basic Business English” and “Study English for Business and Educational Purposes”.

Basic Mathematical Vocabulary

As noted, each level has 1hr of instruction in basic mathematical vocabulary, which accounts for 40% of the final grade for each level. The book which is currently in use is “English for Mathematics”

Specifically, the areas covered are as follows:

- 1st Level: Geometry, the number system, mathematical operations, mathematical symbolism, matrices, equations, proportion.
- 2nd Level: Functions, real analysis, complex numbers, sequences, series, curves and surfaces.
- 3rd Level: Differentiation, integration, vectors, elementary statistics, probability, group theory, logic.

► Requirements for graduation

The number of credit points that correspond to each course equals the weekly number of teaching hours. English is associated with 3 credit points and its final grade is the average of the grades obtained in English II and English III. The English course that is concerned with the preparation of students for the TOEFL (Test of English as a Foreign Language) certificate, is considered as an elective course and does not contribute towards the degree's final grade. French is beyond the requisite credit points for graduation but is associated with the graduation with 3 credit points.

During the final year, students have a choice for the "Summer Placement", which is equivalent to 9 credit points.

In the 4th year of their studies (alternatively in the third year) students may participate in the practical fieldwork programme. Practical fieldwork corresponds to 9 credits, last for at least eight weeks and usually takes place during the summer months (July-August). Students who wish to participate in the practical fieldwork should declare it at the time they declare the courses of the spring semester.

Fourth year students may as well choose to undertake a thesis under the supervision of a faculty member. The thesis option is equivalent to 12 credit points and can replace only elective courses. Students wishing to work on a thesis should declare it at the **beginning of the fourth year**. The thesis' subject is decided after a mutual agreement between the student and her/his thesis supervisor. It must also be approved by the General Assembly of the Department.

The requirements for students to obtain their degree are the following:

- Successful completion of all compulsory courses
- Accumulation of at least 207 credit points
- Successful completion of the English courses

The Grade Point Average (GPA) of each student is calculated based on the following formula:

$$B = \frac{M_1 B_1 + \dots + M_n B_n}{M_1 + \dots + M_n}$$

where n is the total number of courses that the student has passed, B_1, \dots, B_n are the respective grades and M_1, \dots, M_n are the respective weights of the courses. Courses associated with 1-2 credit points correspond to a weight of $M=1$, with 3-4 credit points to $M=1.5$, while courses equivalent to 4 credit points, or more, correspond to $M=2$. For the thesis option $M=4$.

▶ Grades improvements and changes to the student guide

Students who have passed a course and do not fulfill the requirements for a successful degree completion, can sit in for a supplemental examination to improve their grade. For that they have to fill in an application form and submit it to the Secretariat. Supplemental examinations are held during the September examination period and are valid only for courses the student has registered in the current Academic Year. It is in each member's of staff discretion whether the final mark is the maximum between the marks obtained in the regular and the supplemental examinations, or if the supplemental examination mark prevails and is considered as the final one.

The Student Guide of the Department undergoes regular changes so that to keep in pace with the evolution of scientific knowledge and the changing needs of the Greek Labour Market. Students, however, are entitled to the credits obtained from a course(s) even if this course(s) is subsequently eliminated from the Student Guide.

COURSES PER SEMESTER - CREDIT POINTS ECTS (2004-2005)

▶ What is a credit system?

A credit system is a systematic way of describing an educational programme by attaching credits to its components. The definition of credits in higher education systems may be based on different parameters, such as student workload, learning outcomes and contact hours.

▶ What is ECTS?

The European Credit Transfer and Accumulation System is a student-centred system based on the student workload required to achieve the objectives of a programme, objectives preferably specified in terms of the learning outcomes and competences to be acquired.

▶ How did ECTS develop?

ECTS was introduced in 1989, within the framework of Erasmus, now part of the Socrates programme. ECTS is the only credit system which has been successfully tested and used across Europe. ECTS was set up initially for credit transfer. The system facilitated the recognition of periods of study abroad and thus enhanced the quality and volume of student mobility in Europe. Recently ECTS is developing into an accumulation system to be implemented at institutional, regional, national and European level. This is one of the key objectives of the Bologna Declaration of June 1999.

► Why introduce ECTS?

ECTS makes study programmes easy to read and compare for all students, local and foreign. ECTS facilitates mobility and academic recognition. ECTS helps universities to organise and revise their study programmes. ECTS can be used across a variety of programmes and modes of delivery. ECTS makes European higher education more attractive for students from other continents.

► What are the key features of ECTS?

- ECTS is based on the principle that 60 credits measure the workload of a full-time student during one academic year. The student workload of a full-time study programme in Europe amounts in most cases to around 1500-1800 hours per year and in those cases one credit stands for around 25 to 30 working hours.
- Credits in ECTS can only be obtained after successful completion of the work required and appropriate assessment of the learning outcomes achieved. Learning outcomes are sets of competences, expressing what the student will know, understand or be able to do after completion of a process of learning, long or short.
- Student workload in ECTS consists of the time required to complete all planned learning activities such as attending lectures, seminars, independent and private study, preparation of projects, examinations, and so forth.
- Credits are allocated to all educational components of a study programme (such as modules, courses, placements, dissertation work, etc.) and reflect the quantity of work each component requires to achieve its specific objectives or learning outcomes in relation to the total quantity of work necessary to complete a full year of study successfully.

SEMESTER A

Calculus I	[-C-]	6
Linear Algebra	[-C-]	6
Introduction to Computer Science	[-C-]	6
Introduction to Insurance	[-C-]	6
Introduction to Probability theory and Statistics	[-C-]	6
English I	[-C-]	
Physical Education	[-E-]	
	TOTAL	30

SEMESTER B

Calculus II	[-C-]	6
Probability Theory I	[-C-]	6
Introduction to Financial Mathematics	[-C-]	6

Statistics I	[-C-]	6
Macroeconomics	[-C-]	6
Communication – Theory Methods and Communication Techniques	[-C-]	
English II	[C-]	
Physical Education	[-E-]	
	TOTAL	30

SEMESTER C

Calculus II	[-C-]	6
Probability Theory I	[-C-]	6
Statistics II	[-C-]	6
Numerical Analysis and Programming	[-C-]	6
Stochastic Processes I	[-C-]	6
Communication – Theory Methods and Communication Skills	[-C-]	
English III	[-C-]	
Physical Education	[-E-]	
	TOTAL	30

SEMESTER D

Introduction to real analysis	[-C-]	6
Ordinary Differential Equation	[-C-]	6
Regression Analysis	[-C-]	6
Stochastic Processes II	[-C-]	6
Microeconomics	[-C-]	6
Physical Education	[-E-]	
	TOTAL	30

SEMESTER E

Financial Mathematics I	[-CA-]	6
Life Insurance	[-CA-]	6
Mathematics of Life Insurances I	[-CA-]	6
Operations Research	[-E-]	4
Investments	[-E-]	4
Introduction to the social thought I	[E-]	
Introduction to Law	[-E-]	
French I	[-E-]	

Statistical Packages I	[-CS-]	6
Sampling Theory	[-CS-]	6
Analysis of variance and design of Experiments	[-CS-]	6
Demography	[-E-]	4
Data Bases	[-E-]	4
Statistical Quality Control	[-E-]	4
	*TOTAL	30

SEMESTER F

Financial Mathematics II	[CA-]	6
General Insurance	[-CA-]	6
Mathematics of Life Insurances II	[-CA-]	6
Risk measurement and management	[-E-]	4
Mortality Analysis	[-E-]	4
Accounting	[-E-]	4
Multivariate Analysis	[-CS-]	6
Generalized Linear Models	[-CS]	6
Bayesian Statistics	[-CS] [-CA-]	6
Introduction to the social thought II	[-E]	
Gender and Employment	[-E]	
French II	[-E-]	
Statistical Packages II	[-E-]	4
Decision Theory	[-E-]	4
Socioeconomic Statistics	[-E-]	4
Sequential Analysis	[-E-]	4
	*TOTAL	30

SEMESTER G

Financial mathematics III I	[-CA-]	6
General Insurance Mathematics	[-CA-]	6
Risk Theory I	[-CA-]	6
International Financial Markets	[-E-]	4
Solvecy Testing	[-E-]	4

* 3 courses are chosen from categories [-CA-] and [-CS-] and 3 from category [-E-].

Marketing	[-E-]	4
Development of enterprenial skills I	[-E]	4
Introduction to Partial Differential Equations	[-E-]	4
Special topics of Microeconomical theory	[-E-]	4
English – Toefl	[-E]	
Biostatistics	[-CS-]	6
Time Series	[-CS-] [-CA-]	6
Computational Statistics – Simulation Techniques	[-CS-] [CA-]	6
Nonparametric Statistics	[-E-]	4
Actuarial Statistics – Risk management	[-E-]	4
Non – linear models	[-E-]	4
	*TOTAL	30

SEMESTER H

Risk Theory II	[-CA-]	6
Pension Schemes	[-CA-]	6
Reinsurance	[-CA-]	6
Stochastic Dynammic Programming	[-CA-]	6
Corporate Finance	[-E-]	4
Extereme Events Modeling	[-E]	4
Econometrics	[-CS-] [-CA-]	6
Data Analysis	[-CS-]	6
Survival Analysis	[-CS] [-CA-]	6
Categorical Data Analysis	[-E]	4
Economic and Financial Statistics	[-E-]	4
Modern techniques in forecasting and modeling	[-E-]	4
Measure Theory	[-E-]	4
An Introduction to Enviromental Statistics	[-E-]	3
Development of enterprenial skills II	[-E-]	
English – Toefl	[-E-]	
Communication Techniques – Practice	[-E-]	
Practical Fieldwork	[-E-]	
	*TOTAL	30

* 3 courses are chosen from categories [-CA-] and [-CS-] and 3 from category [-E-].

FACILITIES AND RESOURCES

Library

The library of the School of Sciences is located at “Chadjigiannio”, a renovated classical building dating from 1903. It is a branch of the central library, which is based on the island of Lesbos. The library is lending and it is opened every day from 8:30 until 15:00, and during the afternoon if there is available staff.

The library has:

- 17.000 books. The majority of these books belong to the area of Mathematics, Informatics, Physics and aim at supporting the teaching and the research activities of the School. There are also literature books, essays etc.
- 151 international journals and 15 Greek journals. Some of them are available in microfiche form.
- Encyclopaedias, dictionaries etc.
- 400 CDs of classical music, videotapes, cassettes, CD-ROMS.
- Doctoral theses, technical reports.

The library is being enriched with about 1,500 books every year that correspond to all sectors of the School. Many operations in the library (borrowing books, ordering books, search of books or journals) can be done electronically. The search is possible using telnet in the page of the library with address: <http://www.lib.aegean.gr>

Every member of the University of the Aegean has the right to borrow books from the library. For this purpose she/he needs an appropriate card that can be obtained by giving her/his photograph and her/his student or her/his identity card to the library staff. The borrowing time varies from 1 week (7 days) for the undergraduate to 15 days for the postgraduate students. The upper limit in the numbers of borrowed books is 5 and 8 respectively. For more details please feel free to look at our web site that has been mentioned above.

The library belongs to the National Collaboration Network of Scientific and Technological libraries. A library user can order a paper from other libraries of Greek or abroad. In the “Chadjigiannio” building there is a well-equipped room, which has been used for lectures, exhibitions and music concerts.



Career Office

The aim of this office is the following:

- To help students find a suitable graduate program, either in Greece or abroad.
- To help students with their CV's, cover letters, interviews, etc.
- To organize employment-related seminars, daily meetings and job-fairs.
- To keep a database with the students' CV's for employment opportunities.

For more information please be free to contact Mrs Tsesmeli Nikoleta

(Telephone number: 22730-82012, email: ntsesm@aegean.gr)

Computer Center

The main purpose of the computer center is the fulfillment of the communications-network-computational needs of the three departments of the School of Sciences. It offers the necessary infrastructure for the teaching-research-administrative needs of the three departments. The computer center supports all computer users and is responsible for installing and supporting the software packages licensed to the School. It also supports the lab exercises, the development of computerized applications and the telecommunication connections in Samos. It is responsible for the supply and the maintenance of the equipment and software. Anyone (member of staff, student, cooperator of the University) who wishes to have access to the computer facilities of the University may contact the computer center. There is committee supervising the computer center, consisting of staff and students.

Resources

1. **Hardware:** The equipment of the computer center consists of servers and personal computers that are available to the users of the School of Science. Servers: All basic network services (email, telnet, ftp, library search, www browsers) are supported by Windows NT Servers. The servers are 11 (3 Compaq 3000, 7 Pentium II, 1 Sun 3500) and the operating systems are Windows Nt 4.0, Linux and Sun OS. A personal computer and a telephone is given to every member of academic and administrative staff, visiting professors and postgraduate students. There are 4 computer laboratories where the students become familiar with various practical courses, as a programming language or a statistical package. The total number of personal computers is 143. There are also 31 Laser printers and 10 Inkjet and Dotmatrix Printers.
2. **Software:** The operating systems that are used in the different types of computers are Windows NT2000 and Nt 4.0, Windows 98 and Windows 95, Linux, SunOs, MacOS. There are many available applications as: programming languages (Visual C, Pascal, Fortran, Expert Systems), mathematical packages (Mathematica, Maple, Scientific Work-

place), statistical packages (SPSS, SPLUS, Minitab, SAS), applications for office organization (Microsoft Office, Corel Draw, Photoshop).

- 3. Telecommunications - Networks:** All buildings of the School of Sciences are connected with the network. The telephone calls from Samos to Athens are made through hired lines with capacity 2 Mbps. The network services are: email, telnet, ftp, www browsers, search in the library etc.

STUDENT CARE

Student Facilities

- All students have full healthcare coverage, which includes: medical and hospital examination, examinations at home, medicine, pregnancy, physiotherapy, dental care, and orthopedic devices.
- There are discount cards for the students who use railways, ships and buses to travel within Greece. The discount card is valid for the whole academic year. The student obtains a discount by showing a special student discount identification card. A student claims this identification card from the administrative office. Their discount right is terminated when a student stops or ends her/his studies, starts his military service, or completes the year limit of the discount, which is 6 years.
- The University offers students the opportunity for a free meal-plan. This possibility, however, depends on their personal as well as on their family's income. Any student who qualifies for a free meal-plan can apply at the administration office. The free meal-plan stops when the student graduates or after 6 years since her/his first enrolment even if she/he hasn't yet graduated.

Student Union

The student's extracurricular activities are an important part of their academic life. The Student Union is a place where most of these activities take place. Its purpose is entertainment, sports as well as cultural and social events.

Scholarships

The Foundation of State Scholarships gives scholarships to some undergraduates students who have distinguished in the entry examinations or in the examinations during their studies in the University.

Local organisations such as the Municipality of Karlovassi, the Municipality of Vathi, the Union of wine Producers of Samos, the Prefecture of Samos provide various scholarships to distinguished students.

Last year, at the celebration of the "Day of Private Insurance" (11th of November), the graduate with the highest grade point average was awarded a special price by the Greek Insurance Companies Association, including a memorial tablet and a laptop.

Students interested in further information should contact the Administration Office.

Student life in Karlovassi

The Department of Statistics and Actuarial - Financial Mathematics belongs to the School of Sciences of the University of the Aegean, which is located at Karlovassi on the island of Samos. Karlovassi is a small city. Its population consists of 9.600 people during the winter. During the summer it increases considerably. The small population of the city allows the students to built very close relations. They get to know each other very well and participate in various common activities. Local people have socially embraced the students of the University. At Karlovassi, a student can find many recreational facilities. There is a cinema, where someone can enjoy contemporary commercial films and a cinema club, in which a quality film is shown every week. There are many restaurants, cafeterias and night clubs.

The island of Samos is an ideal place for those who like to walk in nature. There are also many interesting archaeological sites, especially in the eastern part of the island, and an important archaeological museum at Vathi.

The Student Unions of the Department of Mathematics and the Department of Informational and Communications Systems have created:

- Radio Station
- Photo Club – Music Club
- Theater Club – Cinema Club
- Football, Basketball, Tennis Teams

The students who wish to participate in some of these clubs can contact a representative of the Student Union.

Students have access to the following places for athletic exercise:

- The Stadium with an indoor basketball, volleyball ground and outdoor football, volleyball, basketball grounds.
- Two tennis courts that belong to a local tennis club. And can be used by students.
- A private football ground (5x5)

There is also the Karlovassi Naval Athletic Club. Sailing is included in its activities.

RESEARCH AND TEACHING

European Educational Programs

The Department of Statistics & Actuarial - Financial Mathematics takes part into 8 ERASMUS/SOCRATES programs (corporative programs between universities). During these programs the students can visit Universities of other countries in order to study or to fulfill their dissertations, for a 3 -12 months period. The studies are admitted as part of their studies in their own department.

The role of the Office of Academic Programmes and International Relations is to develop and support the academic collaboration and exchanges between the University of the Aegean and respective foreign institutions. The Office is responsible for the SOCRATES/ERASMUS programme, for bilateral agreements signed by the University of the Aegean and other interested external institutions, the coordination of student and academic staff mobility, and the support of exchange students admitted to the University of the Aegean.

Practical Fieldwork

The Department pays special attention to the "practical fieldwork" of the students, for more than one reasons, as students who take this option, amongst others, can:

- combine their theoretical background with work experience;
- develop or strengthen their practical skills;
- have a feeling of the working conditions,
- find the experience they get useful in the elaboration of their dissertation;
- use this period as "work experience" in their CV.
- develop a professional relationship with the company in which they do their practice and have a job offer by that company in the future.

Practical fieldwork has a duration of eight weeks at least and it usually takes place during the summer months (July and August). When practical fieldwork is completed students have to write and present a report. The assessment of each student is based on that report as well as on the "assessment report" which is completed for each student by an executive of the host-company. The practical fieldwork corresponds to 9 credits.

At the moment the Department co-operates with many companies in the fields of statistics, finance, and actuarial science. Only a sample of these companies is listed below:

Company Name	Company Name
1 Bank of Greece	10 National Insurance
2 National Bank of Greece	11 Interamerican Insurance
3 Emporiki Bank	12 ING
4 ATE Bank	13 SPSS Greece
5 Egnatia Bank	14 Therapy Centre for Dependent Individuals
6 HSBC Bank	15 Quantos SA
7 National Securities SA	16 Institute of Economic and Industrial Studies
8 Omega Mutual Funds SA	17 Agricultural Insurance
9 Emetris SA	

Conferences

The Department of Statistics & Actuarial – Financial Mathematics has organized (27 - 28 May 2000) an international conference entitled:

“1st Conference in Actuarial Science and Finance at Samos”.

The second conference was organized in 20 – 22 September 2002 entitled:

“2nd Conference in Actuarial Science and Finance on Samos”.

A third conference was held on Samos, on September 2-5, 2004, entitled:

“3rd Conference in Actuarial Science and Finance on Samos”.

For more information please visit the web site:

<http://www.stat.ucl.ac.be/Samos2004/>

Workshops – Daily meetings

The Department of Statistics and Actuarial - Financial Mathematics has organized the first Summer School in Financial Mathematics, in July 10-15, 2003.

Furthermore, four daily meetings have taken place:

- **“The job market for statisticians in Greece”** (March 2002),
- **“Employment opportunities in the financial sector”** (May 2003),
- **“Career Opportunities and future prospects in Statistics”** (December 2003)

and

- **“Structures - Operation and Developments in the Athens Stock Exchange”,
“Fundamental Concepts of the Greek Capital Market”**
(June 2004, 06/10 and 06/11 respectively)

ACADEMIC CALENDAR 2005-2006

FALL SEMESTER 2005-2006

Beginning of classes:	03.10.2005	
End of classes:	13.01.2006	
Duration of the semester:	13 weeks	
Examination period:	<i>Beginning:</i>	16.01.2006
	<i>End:</i>	10.02.2006
Holidays:	28.10.2005	National Holiday
	17.11.2005	Polytechnic anniversary
	24.12.2005-06.01.2006	Christmas break
	30.01.2006	Religious Holiday

SPRING SEMESTER 2005-2006

Beginning of classes:	20.02.2006	
End of classes:	02.06.2006	
Duration of the semester:	13 weeks	
Examination period:	<i>Beginning:</i>	05.06.2006
	<i>End:</i>	30.06.2006
Holidays:	06.03.2006	Ash Monday
	25.03.2006	National Holiday
	<i>To be arranged</i>	Student elections
	17.04.2006-30.04.2006	Easter break
	<i>To be arranged</i>	Cultural Week
	01.05.2006	1 st -of-May Holiday
	12.06.2006	Religious Holiday