

Bachelor Degree in Quantitative Methods

QUA	101	Principles of Quantitative Methods(1)
QUA	102	Principles of Quantitative Methods(2)
QUA	111	Quantitative Methods (1)
QUA	121	Quantitative Methods (2)
QUA	131	Social Insurance
QUA	151	Computer in Administrative Sciences (1)
QUA	211	Mathematics of finance
QUA	212	Advanced Quantitive Methods
QUA	223	Demographic Analysis(1)
QUA	226	Nonparametric Quantitive Methods
QUA	231	Risk and Insurance (1)
QUA	245	Quantitative analysis in Management(1)
QUA	253	Use of Computer in Administrative Science(2)
QUA	291	Scientific Research Methods
QUA	322	Theoretical Quantitive Methods
QUA	323	Business Forecasting (1)
QUA	325	Quantitative Methods in Business
QUA	345	Quantitative Analysis in Management (2)
QUA	425	Multi-Variate Analysis in Management
QUA	426	Theoretical Quantitative Methods (2)
QUA	428	Quantitative Methods in quality control
QUA	441	Theory of Business Decision
QUA	442	Model Building in Management
QUA	443	Investment Analysis

Description of courses

QUA 101 Principles of Quantitative Methods (1) (3 credit-hours)

Basic concepts – collection and presentation of data – average and measures of dispersion – index numbers and time series. Probability concepts (basic rule and bayes thermo)-random variable (discrete and continuous)-probability function-mathematical expectation-binominal, poisson and normal distribution and its applications in administrative science.

QUA 102 Principles of Quantitative Methods (2) (3 credit-hours)

Revision of permutations, combinations and binominal theorem - second degree equations - inequalities. Introduction to linear algebra: matrices and algebraic operations - type of matrices - determinants and their properties - inverse matrix - solution of homogenous and non-homogenous simultaneous linear equations. Introduction to differentiation and integration of functions of one variable: types of functions-theorems of limits-continuity of functions - the derivative - derivatives of exponential and logarithmic functions. Applications of differentiation: increasing and decreasing functions-relative maxima and minima and points of reflection. Integration: indefinite and definite integrals and calculation of areas.

QUA 111 Quantitative Methods (1)(3 credit-hours)

Functions of several Variable: partial differentiation-total differentials-total derivatives-homogeneous functions and Euler's theorem –maximum and minimum values with and without constraints-multiple integration both definite and indefinite with applications in administrative sciences. Matrices: Elementary operations on rows and columns- rank- determinants-inverse matrix-partitioning of matrices solution of linear simultaneous equations using operations of rows-characteristic roots and vectors-quadratic form-differentiation of matrices with application in administrative sciences.

QUA 121 Quantitative Methods (2) (3 credit-hours)

Sampling distributions-statistical inference (estimation and testing of hypothesis) for large and small samples(T,F,X₂),distributions)-test of homogeneity, independence and goodness of fit-simple and multiple regression and correlation- inference about regression and correlation coefficients-applications in administrative sciences.

QUA 131 Social Insurance (3 credit-hours)

The early origin of social insurance and its development. The characteristics of social insurance and its branches. Social insurance funding (types, procedures and methods of funding (types, procedures and methods of funding).Health social insurance: Elements of medical care, loss of income due to sickness and means of tackling it. Main factors to assess medical care, principles of medical care cost analysis. Industrial insurance: insured person, covered risks, medical care in case of injury - basis of calculating lump sum and pension benefits in case of temporary and total incapacity. Methods of calculating contributions.

QUA 151 Computer In Administrative Sciences (1) (3 credit-hours)

Concept of computer and its development - number systems - computer hardware components, peripherals and their functions - data processing - programming languages, Programming with Basic: Constants and variables - logical operations - arithmetic operations - data entry - displaying information - applications in administrative sciences.

QUA 211 Mathematics of Finance (3 credit-hours)

Introduction and definitions - the general law of simple interest –true and commercial interest – present value and discount-the sum of annuities-certain using fixed and variable simple interest rates- some practical applications on simple interest including methods of redemption of short term loans, modification of loans and saving accounts. The general law of compound interest: the sum, present values and discount –the nominal rate of compound interest – the calculation of the sum and present value of annuities –certain with fixed and variable compound rates of interest-some practical applications on compound interest including methods of redemption of long term loans, modification of loans and redeemable securities.

QUA 212 Advanced Quantitative Methods (3 credit –hours)

Functional and numerical analysis: Sequences – series –taylor,s and maclaurin,s expansion- extrapolation(analysis of observation results)with applications in administrative sciences. Differential equations: order and degree of differential equations-separation of variable-solution of linear differential equations – integrating factor- Bernoulli's equation with applications in administrative sciences. Difference Equations: order and degree difference equations- solution methods of the first and second order difference equations with applications in administrative sciences.

QUA 223 Demographic Analysis (1)(3 credit-hours)

Basic concepts in demographic analysis- sources of data - population change - mortality concepts and its measurement - adjusting infant mortality rates-analysis of fertility - population growth.

QUA 226 Nonparametric Quantitative Methods (3 credit-hours)

Importance of nonparametric statistical methods - goodness of fit tests- inferences concerning location parameters based one or more samples - inference concerning scale parameters - association analysis - tests for randomness s- applications in administrative sciences.

QUA 231 Risk and Insurance (1) (3 credit –hours)

Concept of Risk- kinds of risk- risk and probability - introduction to quantitative measures of risk-methods of risk control and the effect of each on expected financial loss. The establishment of insurance and its development - different kinds of insurance- insurance organizations- basic principles of insurance- quantitative method for estimating claims. Co-insurance, subrogation and the average principle. Introduction to property insurances: insurable and uninsurable risks in fire, accident and marine insurance.

QUA 245 Quantitative Analysis in Management (1) (3 credit-hours)

The role of quantitative analysis and operations research approach in studying management problems- the idea of model building - basic concepts of linear programming and its economic and administrative applications: The problem in its general form- the graphical solution- simplex method- transportation problem – the duality theorem, shadow prices and principle of complementarity –economic and administrative interpretation of the solution.

QUA 253 Use of Computer in Administrative Sciences (2) (3 credit-hours)

Programming with COBOL: Basic elements of the COBOL language- division of a COBOL program and the contents of each division. COBOL statements and clauses: Statements for data entry, arithmetic operations, conditional and unconditional branching and output results- table handling (one, two, and three level tables)

QUA 291 Scientific Research Method (3 credit-hours)

Scientific Research Methods: Their origin and development – techniques and tools of scientific research – specification of the problem and setting research plan – sources of data methods of collecting and presenting data- drawing conclusions from research – organization and use of library – methods of quotation – writing preliminary and final reports – organizing the list of reference- practical application.

QUA 322 Theoretical Quantitative Method (1) (3 credit- hours)

Random variable - probability functions- distribution function - joint probability function for several variables: marginal and conditional distributions - moments - moment generating function - characteristics function - transformation of variables- derivation of basic probability distributions.(and their moments): Poisson, Gamma, normal, T, F and X_2 - central limit theorem and its application. Introduction to stochastic process.

QUA 323 Business Forecasting (1) (3 credit-hours)

Forecasting of business - freehand method - forecasting through simple and multiple regression methods- forecasting through simultaneous equations models- precision of forecasts - applications in administrative science.

QUA 325 Quantitative Method in Business (3 credit-hours)

Sample survey and its application in the field of economic and business - steps of samples survey - sources of errors in surveys - the simple random sample - sample size - ratio estimation - stratified, systematic, cluster and multistage sampling - basic principles of experimental designs - completely randomized, randomized blocks and Latin square designs - factorial designs - applications in the field of administrative sciences.

QUA 345 Quantitative Analysis in Management(2) (3 credit-hours)

The course covers the basic concepts of some topics of quantitative analysis in management through it application in the field of economic and administration. These topics are: Decision Theory: elements of the problem of decision making-rules of probabilistic and non-probabilistic decisions - multi-stage decisions. Inventory control: elements of the inventory problem - application of inventory models in case of certainty and uncertainty. Queues: The structure of Queuing models - some Queuing probabilistic models in case of single server or multiple-server - Queuing decision model - simulation models and its application in decision theory, queuing and inventory policies.

QUA 425 Multi- Variate Analysis in Management (3 credit-hours)

Joint, marginal and conditional distributions - the multivariate normal distribution - estimators of the mean vector and covariance matrix and their distributions- canonical correlations and variables - principal components - discriminant analysis - factor analysis - applications in administrative science.

QUA 426 Theoretical Quantitative Method (2) (3 credit-hours)

Point estimation: criteria of good estimators (sufficiency, consistency, unbiasedness, efficiently) - different estimation methods: estimation using moments, maximum likelihood, lest squares and bayes methods- interval estimation for the mean and variance using the normal and binominal distributions - test of simple and composite hypothesis - likelihood ratio test-some order statistics.

QUA 428 Quantitative Methods in Quality control (3 credit-hours)

Meaning and importance of quality control in industry –control charts for variables- control charts for attributes acceptance sampling plans- rectifying inspection plans- applications in industry.

QUA 441 Theory of Business Decision(3 credit –hours)

Decision Making in non-competitive situations – decision criteria –revising probabilities using bayes theorem – decision tree and the revised probabilities- optimal sample size and the expected value of sample information- utility function- with applications to business. Decision making in competitive situations: the general description, and the concept of strategy and its properties- relation between the expected payoffs of competitors. Relation between the nature of the strategy and the system of information-introduction to the principles of the general game-applications in administrative sciences.

QUA 442 Model Building in Management (3 credit-hours)

Nature of the problem and its formulation-objective function-types of model and the frames of models building-introduction to system and model building : types of management system and its criteria –system analysis and the choice of the proper model for the problem or management situation: The mathematical form- the solution of the model-application to administrative models.

QUA 443 Investment Analysis.(3 credit-hours)

Factors effecting investment - securities analysis and the determination of the true rate of return after eliminating effects of inflation and exchange rats - short term portfolios diversification in case of constraints and in case of no constraints - investment risk and the evaluation of correlation. Coefficients between different securities-evaluation o equity stocks and bonds financial institutions and money markets.