B.A(QUANTITATIVE TECHNIQUES)

Semester	Subject Code	Subject
Sem-I	BA(QT)-101	QUANTITATIVE TECHNIQUES-I
Sem-III	BA(QT)-301	QUANTITATIVE TECHNIQUES-III
Sem-V	BA(QT)-501	QUANTITATIVE TECHNIQUES-V

LESSON PLAN B.A (QUANTITATIVE TECHNIQUES) SEMESTER-I QUANTITATIVE TECHNIQUES

Topic-I

Topic	Resources	Time
Solution of Linear And Quadratic Equations	Allen, R.G.D.: Mathematical Analysis for Economists. Edward T Dowling: Introduction to Mathematical Economics.	Two weeks
Introduction: The Systems of Linear and quadratic Equations are designed to learn the properties and options for solving systems of equations by using different methods like substitution method, elimination method ,cross-elimination method etc.		
Body of the lesson: Solution of Simultaneous Linear Equations (upto two variable case), Application of Linear Equation in Economics; Solution of Quadratic Equations with application in Economics		
Conclusion: This lesson unit is intended to help you assess how well students are able to formulate and solve problems using algebra and, in particular, to identify and help students who have the following difficulties solving a problem using linear and quadratic equations with two variables and interpreting the meaning of algebraic expressions in economics.		

Topic-II

Topic	Resources	Time
Series: Arithmetic Progression Series, Geometric Progression Series	Allen, R.G.D.: Mathematical Analysis for Economists. Edward T Dowling: Introduction to Mathematical Economics.	Two Weeks
Introduction: To follow the reasoning to deduce the general term of a progression as the mathematical expression that relates the position that occupies a term in the sequence with its value.		
Body of the lesson: Formula for the sum of the first n terms of any arithmetic and geometric sequence. Infinite sum of G.P.series, formation of series and their applications in economics		
Conclusion: Students will be able to learn the use of series in solving economic problems on the topic mentioned above. Assignment on A.P. And G.P.		

Topic-III

Topic	Resources	Time
Analytical Geometry and Trigonometry	Allen, R.G.D.: Mathematical Analysis for Economists. Edward T Dowling: Introduction to Mathematical Economics.	TWO Weeks
Introduction: Trigonometry is a branch of <u>mathematics</u> that studies relationships involving lengths and <u>angles</u> of <u>triangles</u>... Analytic geometry is the study of geometry on a grid called the coordinate plane, or *xy*-plane. Certain aspects of geometry can be handled very easily in the coordinate plane: distance between points, slopes of lines, finding midpoints, etc.		
Body of the lesson: Trigonometry starts by defining two basic functions on $\angle\theta$, namely, $\sin\theta$ and $\cos\theta$. Relation between $\sin\theta$ and $\cos\theta$. The Distance Formula, The Midpoint Formula, slope of a line, angle between lines etc. ,		
Conclusion: Students will be able to learn the use of geometry and trignonmetry in economics. Assignment related to the topic.		

Topic-IV

Topic	Resources	Time
combination , Permutation and Set theory	Allen, R.G.D.: Mathematical Analysis for Economists. 4. Edward T Dowling: Introduction to Mathematical Economics.	Two weeks
Introduction: In this lesson, we learned the basic concepts and formulae useful for solving questions on Permutations & Combinations. Set theory is a branch of mathematical logic that studies sets, which informally are collections of objects.		
Body of the lesson: Permutation is defined as arrangement of r things that can be done out of total n things. This is denoted by $^{n}P_{r}$ which is equal to $n!/(n-r)!$ Combination is defined as selection of r things that can be done out of total n things. This is denoted by $^{n}C_{r}$ which is equal to $n!/r!(n-r)!$ Union , intersection of sets, proper subsets, venn-diagramms, De-Morgan's law ,identity law, distributive law etc and its economical applications		
Conclusion: Students will be able to learn the use of combination , Permutation and Set theory Assignment on the related topic.		

Topic-V

Topic	Resources	Time
functions, graph of linear and quadratic functions (Economic applications). Limits and continuity of a function.	Allen, R.G.D.: Mathematical Analysis for Economists. 4. Edward T Dowling: Introduction to Mathematical Economics.Mathematical analysis for Economists, Allen R.G.D	Two weeks

Introduction: The student will be able to differentiate between a relation and a function.

Body of the lesson: Basic concepts domain ,range , co-domain, types of functions with their graphs, continuity types of discontinuity. Difference between a constant and a variable, concept of functions, classifications of functions, graph of linear and quadratic functions (Economic applications). Limits and continuity of a function.

Conclusion: Students will be able to learn the use of functions,limit and continuity of the function Assignment on on functions and continuity.

Topic-VI

Topic	Resources	Time
Concept of differentiation	Allen, R.G.D.: Mathematical Analysis for Economists. 4. Edward T Dowling: Introduction to Mathematical Economics.	Two Weeks

Introduction : The essence of calculus is the **derivative**. Thederivative is the instantaneous rate of change of a function with respect to one of its variables. This is equivalent to finding the slope of the tangent line to the function at a point.

Body of the lesson: ab-intio principle, Derivatives (Excluding Trigonometric and Inverse Functions): Rules of derivatives; functions of functions rule; derivatives of implicit functions, parametric functions, exponential functions, logarithmic functions (Application in Economics

Conclusion: Derivative is the slope of a tangent line. A function's derivative can be used to search for the maxima and minima of the function by searching for places where its slope is zero.

LESSON PLAN B.A(QUANTITATIVE TECHNIQUES) SEMESTER-III QUANTITATIVE TECHNIQUES

Topic-I

Topic	Resources	Time
Matrices and Determinants	Mathematics and Statistics for Economics, G.S Monga, Mathematics for Economics, Yamane Taro	Four Weeks
Introduction: Matrix is a rectangular array of elements in rows and columns put in large braces. In algebra, a determinant is a function depending on n that associates a scalar, det(A), to every n×n square matrix A.		
Body of the lesson: Types of matrices, Algebra of matrices. Inverse of matrix. Concept of determinants. Solution to system of linear equations. Applications of both matrices and determinants in economics.		
Conclusion: Students will be able to learn the basics of matrices and determinants and be able to solve the various problems in economics with the help of them. Assignment on Matrices and determinants		

Topic-II

Topic	Resources	Time
Differentiation	Mathematics and Statistics for Economics, G.S Monga, Mathematics for Economics, Yamane Taro, Fundamental Methods of Mathematical Economics, Chaing, A.	Two Weeks
Introduction: Differentiation involves finding the rate at which a variable quantity is changing. This is useful in business and economic applications concerning changes like growth, decay, costs and profit etc. A partial derivative is a derivative of a function with respect to a single argument of the function, holding the other arguments fixed. The study extends to Higher order partial derivatives.		
Body of the lesson: Testing of functions for maxima and minima using first derivative and second derivative tests. Second order partial derivatives with economic applications such as minimization of cost &maximization of profit and Elasticities.		
Conclusion: Students will be able to learn the use of partial derivatives in solving economic problems mentioned above. Assignment on Differentiation		

Topic-III

Topic	Resources	Time
Integration	Mathematics and Statistics for Economics, G.S Monga, Mathematics for Economics, Yamane Taro, Fundamental Methods of Mathematical Economics, Chaing, A.	Two Weeks
Introduction: The process of integration consists in finding a function whose derivative or differential is already known. The resulting function is an anti-derivative usually called an integral. There are two fundamental concepts of integral calculus: Indefinite integral and definite integral.		

Body of the lesson: Indefinite integrals by Partial Fractions; Substitution; Integration by Parts; Definite Integrals. Application of Integration in Consumer Surplus and Producer Surplus.
Conclusion: Students will be able to learn the use of Integral calculus in economics. Assignment on Integral calculus.

Topic-IV

Topic	Resources	Time
Linear Programming	Fundamental Methods of Mathematical Economics, Chaing, A.	Three Weeks
Introduction: Programming means planning. In economics, programming means planning of economic activities to get optimal solutions to problems. Linear programming is a practical tool of analysis and calculation which yields the optimum for a linear objective function subject to constraints in the form of inequalities.		
Body of the lesson: Formulation of problem, Assumptions, Graphical solution, Simplex method. Use of Artificial Variables, Dual Simplex method.		
Conclusion: Students will be able to learn the use of linear programming in solving diet problems, transportation problem etc. Assignment on Linear Programming.		

Topic-V

Topic	Resources	Time
Input-Output Analysis	Mathematical analysis for Economists, Allen R.G.D	One Week
Introduction: Input output analysis is a technique for analysis interindustry relations. It is an analysis of the interdependence of the economy as a whole and studies the pattern of movements of intermediate products from one industry to other industries and the consumers.		
Body of the lesson: Basic concepts, Input-Output tables for closed and open economies, Leontief Basic Input-Output Model, Simple Applications of Input-Output Analysis.		
Conclusion: Students will be able to learn the use of basics of input and output concepts to economics. Assignment on Input-Output Analysis.		

LESSON PLAN B.A(QUANTITATIVE TECHNIQUES) SEMESTER-V

QUANTITATIVE TECHNIQUES

Topic	Notes/Strategies/Resources	Time
Sampling Distributions	The topic will help the students to have in depth knowledge about the sampling distributions and their importance	2.5 weeks
Body of Lesson: • Derivation of Z distribution • Derivation of the properties of Z distribution • Derivation of t distribution • Derivation of the properties of t-distribution	Students will be given notes pertaining to the theory of the chapter. Importance of both the distributions will be discussed. The books consulted will be "Statistics : Theory & Practical" by Murry and Spiegal " Fundamentals of Mathematical Statistics" by Kapur and Gupta	
Conclusion	Assignments will be given. Tests will be conducted.	

Topic	Notes/Strategies/Resources	Time
Sampling Distributions-Contd.	The topic will help the students to have in depth knowledge about the sampling distributions and their importance	2.5 weeks
Body of Lesson: • Derivation of chi square distribution • Derivation of the properties of chi square distribution • Derivation of F distribution • Derivation of the properties of F distribution	Students will be given notes pertaining to the theory of the chapter. Importance of both the distributions will be discussed. The books consulted will be "Statistics : Theory & Practical" by Murry and Spiegal " Fundamentals of Mathematical Statistics" by Kapur and Gupta	
Conclusion	Assignments will be given. Tests will be conducted.	

Topic	Notes/Strategies/Resources	Time
Statistical Inference	The topic will help the students to have in depth knowledge about the concept of a good estimator. Hypothesis testing will also be studied in detail.	3 weeks
Body of Lesson: • Point and interval Estimation • Maximum Likelihood Method of Estimation • Its applications for Binomial, Poisson and Normal distribution • Concepts of Null and Alternative hypothesis • One and two tailed tests • Critical region	Students will be given notes pertaining to the theory of the chapter. Numerical problems will be taken in the class. The books consulted will be "Statistics : Theory & Practical" by Murry and Spiegal " Fundamentals of Mathematical Statistics" by Kapur and Gupta	
Conclusion	Assignments will be given. Tests will be conducted.	

Tests of significance based on normal deviate(Z) and t-statistics	The topic will help the students to have in depth knowledge about the test of significance. Practice of numerical based on these tests will be done in the class.	3 weeks
Body of Lesson: • Tests of significance based on normal deviate • Tests of significance based on t-statistics	Students will be given notes pertaining to the theory of the chapter. Numerical problems will be taken in the class. The books consulted will be "Statistics : Theory & Practical" by Murry and Spiegal " Fundamentals of Mathematical Statistics" by Kapur and Gupta	
Conclusion	Assignments will be given. Tests will be conducted.	

Tests of significance based on chi square and F- statistics	The topic will help the students to have in depth knowledge about the test of significance. Practice of numerical based on these tests will be done in the class.	2.5 weeks
Body of Lesson:	Students will be given notes pertaining to the	

• Tests of significance based on normal deviate • Tests of significance based on t-statistics	theory of the chapter. Numerical problems will be taken in the class. The books consulted will be "Statistics : Theory & Practical" by Murry and Spiegal " Fundamentals of Mathematical Statistics" by Kapur and Gupta	
Conclusion	Assignments will be given. Tests will be conducted.	

Analysis of Variance	The topic will help the students to have in depth knowledge about the techniques of analyzing variance. Practice of numerical based on one way and two way classified data will be done in the class.	2.5 weeks
Body of Lesson: • Introduction of the topic • Assumptions • Techniques of Analysis of Variance • One way ANOVA • Two way ANOVA	Students will be given notes pertaining to the theory of the chapter. Numerical problems will be taken in the class. The books consulted will be "Statistics : Theory & Practical" by Murry and Spiegal " Fundamentals of Mathematical Statistics" by Kapur and Gupta	