

**S.Y.B.A. SEMESTER-3**  
**STATISTICS ELECTIVE PAPER 204 ( PAPER 3)**  
**MATHEMATICAL ECONOMICS**

**1. Differentiation :**

Concept of derivative of a real function, Rules of derivative without proof.

Derivative of the function of types:  $ax+b$ ,  $ax+bx+c$ ,  $(ax+b)(cx+d)$ ,  $ax+b/cx+d$ ,  $e^x$ ,  $a^x$ ,  $\log x$ .

**2 Partial Differentiation:**

Definition of partial derivative involving two variables only up to first and second order. Euler's theorem (Statement only). Simple examples.

**3. Demand and Supply functions:**

Use of derivative in finding stationary values (Maxima and Minima) of function of one variable only. Formulation, their properties, Total and marginal revenue, Total and marginal cost, market equilibrium.

**4. Elasticity and concept of Utility Function:**

Elasticity of demand and supply with respect to its properties, simple examples of elasticity of demand and supply. And only concept of utility function.

**Reference Books:**

- (1) S. C. Gupta & V.K.kapoor : Fundamental of applied statistics Sultan chand & sons New Delhi.
- (2) Sancheti & Kapoor: "Business Mathematics" Sultan chand & Sons, New Delhi.
- (3) Kapoor V. K. : "Business Mathematics" Sultan chand & Sons, New Delhi.
- (4) parimal Mukhopadhyay: "Mathematical Statistics" Books & allied (p) Ltd.

**Activites:**

- (1) Project on Demand and supply function.
- (2) Seminar on Elasticity and concept of Utility Function
- (3) Assignement on above three units.
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- (5) Group Discussion on above four units.

**S.Y.B.A. SEMESTER-3**  
**STATISTICS ELECTIVE 205 ( PAPER 4)**  
**MATHEMATICAL STATISTICS**

**1 Correlation:**

Concept of linear correlation between two variables, Scatter diagram, Karl person's formula for correlation coefficient, Spearman's rank correlation. Calculation of correlation co-efficient from ungrouped data only. Simple examples.

**2 Regression:**

Concept of error in regression, principle of least squares, lines of regression, Coefficient of determination and its interpretation. Uses of regression in forecasting.

**3 Airthmetic and Geometric Progression:**

Meaning of progression and series. The  $n^{\text{th}}$  term and sum of the first n terms of A.P. and G.P. (Without proof). Arithmetic and Geometric mean between two variables.

**4 Interpolation and Extrapolation:**

Meaning and assumptions of Interpolation and Extrapolation, Idea of Operator's  $\Delta$  and E with examples. Newton's and Lagrange's interpolation formula (without proof) simple examples

**Reference Books:**

- (1)D. C. Sancheti & V.K.Kapoor: Statistics Theory, Methods & Application Sultan chand & sons.
- (2)S.C.Gupta & V. K. kapoor : Fundamental of applied statistics Sultan chand & sons New Delhi.
- (3)Sancheti & Kapoor : "Business Mathematics" Sultan chand & Sons,New delhi.
- (4)Kapoor V.K.: "Business Mathematics" Sultan chand & Sons,New delhi.
- (5)parimal Mukhopadhyay: Mathematical Statistics" Books & allied (p) Ltd.

**Activites:**

- (1)Project on Interpolation and extrapolation.
- (2)Presentation on correlation and regression.
- (3)Assignement on above three units.
- (4) Quiz on arithmetic and geometric progression.
- (5)Group Discussion on above four units.

**S.Y.B.A. SEMESTER-4**  
**STATISTICS ELECTIVE 214 (PAPER 3)**  
**APPLIED STATISTICS**

**1 Testing of Hypothesis :**

Introduction, Some related terms :Parameter and statistics, Sampling distribution of a statistics, standard error of a statistics, statistical hypothesis, null hypothesis, Alternative Hypothesis, testing of hypothesis, Test of significance, Level of significance, Degrees of freedom, Critical region, Type-I and Type-II errors and One-tailed and two-tailed tests. Test for variables: Test of significance of mean, Test of significance of difference between two means and two standard deviations. Test for attributes: Test of significance of a proportion and Test of significance about the difference between two proportions.

**2 Large sample test:**

Test for variables: Test of significance of mean, Test of significance of difference between two means and two standard deviations. Test for attributes: Test of significance of a proportions and Test of significance about the difference between two propotion.

**3 Small sample test:**

Chi-square test, t-test and F-test with simple examples.

**4 Statistical Quality Control (S.Q.C.):**

Meaning and scope of S.Q.C., Organization of S.Q.C. in an industry unit, Control charts-3 sigma limits and control limits, Control charts for variables  $\bar{x}$  and R charts, their uses and interpretation, Use of theory of runs. Control charts for attributes: p, np, c charts.

**Reference Books:**

- (1) S.C.Gupta & V.K.kapoor : Fundamental of applied statistics Sultan chand & sons New delhi.
- (2)D.C.Sancheti&V.K.Kapoor: Statistics Theory, Methods & Application Sultan chand & sons.
- (3)S.C.Gupta & V. K. kapoor :Fundamental of applied statistics Sultan chand & sons New delhi.
- (4)Grant E.L.:Statistical quality control,McGraw Hill.

**Activites:**

- (1)Project on statistical quality control control charts for variables.
- (2)Seminar on control charts for attributes.
- (3)Assignment on above three units.
- (4)Study tour.
- (5)Group Discussion on above four units.

**S.Y.B.A. SEMESTER-4**  
**STATISTICS ELECTIVE 215 (PAPER-4)**

**OPERATIONS RESEARCH**

**1 Linear Programming**

Meaning of linear programming, Assumptions and limitations of linear programming, Use of linear programming. Constrains, Solution, Feasible solution, optimal feasible solutions, Simple examples. Mathematical form of Linear Programming problem. Graphical Method of Solving Linear Programming problem.

**2 Transportation problem:**

Meaning of Transportation Problem ,North- West corner rule and Matrix minima methods and Vogle's Approximation method.

**3 Assignment problem:**

Definition of balanced Assignment problem, Hungarian method of solving an Assignment problem.

**4 Decision Theory:**

Ingredients of decision problems : Act, states of nature of events, pay off Matrix, Different methods of Decision making, Maxi-min principle, Maxi-max principle, Laplace principle, Hurwicz principle and Expected monetary value(EMV).

**Reference Books:**

- (1) J.K.Sharma : O.R. Theory and application" Macmillan India Ltd.
- (2) H.A.Taha: O.R. Theory" Macmillan India Ltd.
- (3) D.C.Sancheti&V.K.Kapoor: Statistics Theory, Methods & Application Sultan chand & sons.

**Activites:**

- (1)Project on Linear programming.
- (2)Presentation on O.R.
- (3)Assignement on above three units.
- (4)Lecture on How to use statistics in Research.
- (5)Group Discussion on above four units.