

**PUNYASHLOK AHILYADEVII HOLKAR
SOLAPUR UNIVERSITY, SOLAPUR**



**Name of the Faculty: Commerce and Management
CHOICE BASED CREDIT SYSTEM**

**Name of the Course:
B. Com III - (Semester: V & VI)**

**Title of the Paper:
Advanced Statistics- Paper I & II**

(Syllabus to be implemented w.e.f. June 2021)

Programme Specific Outcomes of B.Com. (Advanced Statistics) /

Preamble

PSO1	Familiarize with the basic concepts of Advanced Statistics and a hands-on experience of the various advanced statistical tools and techniques.
PSO2	Enable them to improve their logical reasoning ability and interpretation of various business results.
PSO3	Acquainting students with the emerging issues in business, trade and commerce regarding analyzing business facts.
PSO4	Study and critically analyze statistical reasoning to problems of business.
PSO5	Boost quantitative thinking and develop numerical abilities.
PSO6	Enlighten abilities to apply the statistical concepts to real life problems in Commerce, Economics, Management and Social sciences.
PSO7	Improve their logical reasoning ability and interpretation of various statistical results.
PSO8	Statistical Techniques in Decision making at Strategic & Tactical Level.

Medium of instruction: **English**

Structure of the course per paper:

Course	Title	Theory Lectures Per	Total Periods of Teaching in a Semester	Duration Of University Exam	For University Exam		For Internal Exam		Total Marks	
					Max Marks	Min Marks	Max Marks	Min Marks	Max Marks	Min Marks
B.Com.III/ Sem-V and Sem-VI	Advanced Statistics	04	60 (15 Weeks)	3 hours	70	28	30	12	100	40

Equivalent Subjects for Old Syllabus

Name of the Old Paper	Name of the New Paper
Advanced Statistics Sem.-V, Paper-I	Advanced Statistics Sem.-V, Paper-I
Advanced Statistics Sem.-V, Paper-II	Advanced Statistics Sem.-V, Paper-II
Advanced Statistics Sem.-VI, Paper-I	Advanced Statistics Sem.-VI, Paper-I
Advanced Statistics Sem.-VI, Paper-II	Advanced Statistics Sem.-VI, Paper-II

Punyashlok Ahilyadevi Holkar
Solapur University, Solapur
B.Com.-III (Semester V) Syllabus

Advanced Statistics- Paper I

(w. e. f. June 2021)

Course Outcomes / Objectives

- CO1: To get the conceptual knowledge of basics of probability.
CO2: To understand probability mass function as a measure of probability.
CO3: To understand Poisson distribution and its real life applications.
CO4: To get familiarize with Bivariate Probability Distribution.
CO5: To enable to calculate mean and variance of Bivariate discrete probability distribution.

Syllabus

Unit No.	Topic	Subtopics	No. of Periods
I	Probability Theory	Introduction to permutations and combinations, Binomial theorem, Concept of Probability, Axiomatic definition of probability, Conditional probability, Bayes' theorem. Examples.	15
IV	Mathematical Expectation	Random variable (r.v.), Discrete random variable. Probability Mass Function (pmf), Cumulative Distribution function, Mean & Variance of a random variable, Definition of Mathematical Expectation of Univariate discrete random variable X. Addition & multiplication laws of mathematical expectation for discrete random variable only. Examples based on these.	15
II	Poisson Distribution	Conditional mean & Conditional Variance. Examples. Definition and properties of Poisson Distribution. Practical situations where Poisson distribution is applicable. Examples.	15
III	Bivariate Probability Distribution	Meaning of bivariate random variable, concept of discrete bivariate random variable. Definition of bivariate probability mass function. Mean & Variance (covariance) of a Bivariate discrete random variable Cumulative Distribution function. Examples.	15

Notes :

1. Use of soundless non-scientific calculators is allowed.
2. More stress should be given on commercial applications

List of Reference books:

1. Fundamentals of Statistics- S. C. Gupta.
2. Business Statistics - Bharat Jhunjhunwala
3. Statistical Methods- S. P. Gupta,
4. Introduction to Statistics- C. B. Gupta.
5. Essential Statistics- A. B. Rao.
6. Statistics for all (Volume I) – S. M. Aherkar
7. Statistics: Theory, Methods and Applications- Sancheti, D.C. & Kapoor V.K
8. Business Statistics :An Applied Orientation- P.K. Viswanathan
9. Statistics and their applications to Commerce - Borddigion
10. Business Statistics- Reddy, C.R Deep Publications, New Delhi.
10. Statistics Problems and Solutions- Kapoor V.K.
11. Fundamentals of Statistics - Elhance.D.N
12. Statistics - Gupta B.N.
13. Practical Business Statistics - Croxton & Crowdory.
14. Statistics Concepts & Applications- Nabendu Pal & Sahadeb Sarkar
15. Business Statistics- J.K.Sharma
16. Business Statistics - R.S.Bharadwa
17. Business Statistics- G V Kumbhojkar, Phadke Publications, Kolhapur

B.Com.-III (Semester V) Syllabus

Advanced Statistics- Paper II

(w. e. f. June 2021)

Course Outcomes / Objectives

- C01 To formulate LPP and to solve it.
- C02 To understand concept of assignment problem and its applications.
- C03 To acquire the knowledge of transportation problem and its solution.
- C04 To accomplish the allotment of jobs to machines in order to minimize the processing time.

Syllabus

Unit No.	Topic	Subtopics	No. of Periods
1	Linear Programming Problems	Formulation of LPP, Solving LPP using Graphical Method, LPP with more than two variables. Use of slack, surplus and artificial variables, Solution of LPP of maximization / minimization type problems by using Simplex method and Big-M method. Examples.	15
2	Assignment Problems	Assignment Problems for minimization and maximization, Mathematical formulation, Solution of AP by Hungarian algorithm. Examples.	15
3	Transportation Problems	Transportation Problems for minimization, methods of finding I.B.F.S., testing solution for optimality (MODI Method). Examples.	15
4	Sequencing	Introduction to sequencing, Assumptions, problem of sequencing of n jobs through 2 machines, n jobs through 3 machines, n jobs through M machines. Examples.	15

Notes :

1. Use of soundless non-scientific calculators is allowed.
2. Graph papers are allowed to use.
3. More stress should be given on commercial applications.

List of Reference books

- 1) Fundamentals of applied statistics by Gupta & Kapoor.
- 2) Operations research by S.D. Sharma
- 3) Quantitative techniques in decision making by J.K. Sharma
- 4) Operations research by R.K. Gupta.
- 5) Statistical Methods by J.Medhi
- 6) Fundamentals Mathematical Statistics by Gupta & Kapoor.
- 7) Introduction to Mathematical Statistics by D.N.Elance.

Punyashlok Ahilyadevi Holkar
Solapur University, Solapur
B.Com.-III (Semester VI) Syllabus

Advanced Statistics- Paper I

(w. e. f. June 2021)

Course outcomes / Objectives

- CO1 To create awareness about various measures of demographic features.
 CO2 To enable fort testing the significance of difference between parameter and statistic.
 CO3 To enable for testing the significance of difference for large samples.
 CO4 To get acquainted with the exact sampling distributions.
 CO5 To enable for testing the significance of difference for small samples.

Syllabus:

Unit No.	Topic	Subtopics	No. of Periods
1	Demography	Introduction, Measures of Mortality (CDR, SDR, STDR by Direct Method, IMR), Measures of fertility (CBR, GFR, SFR, TFR) Reproduction rates: GRR & NRR. Crude rate of natural increase and Pearle's vital index. Assumptions, description and construction of Life tables. Examples.	15
2	Testing Of Hypothesis	Definition of parameter, statistic, hypothesis (Simple & Composite), Null & alternative hypothesis, critical region, level of significance, Type I & Type II error, power of the test, p-value (Only concepts)	15
3	Large Sample Tests	Test for an assumed mean, Test for an assumed proportion, Comparison of means of two populations, comparison of proportion of two populations. Examples.	15
4	Exact Sampling Distributions and their Applications	Definition of Chi-square, t & F variates & their p.d.fs Applications of t distribution: 1) To test $H_0 : \mu = \mu_0$ 2) To test $H_0 : \mu_1 = \mu_2$ Applications of Chi-square distribution: 1) Test of goodness of fit. 2) To test independence of attributes for 2 x 2 contingency table. Applications of F distribution: To test $H_0 : \sigma_1^2 = \sigma_2^2$ Examples.	15

Notes :

1. Use of soundless non-scientific calculators is allowed.
2. More stress should be given on commercial applications.

List of Reference books:

1. Fundamentals of Statistics- S. C. Gupta.
2. Business Statistics - Bharat Jhunjhunwala
3. Statistical Methods- S. P. Gupta,
4. Introduction to Statistics- C. B. Gupta.
5. Essential Statistics- A. B. Rao.
6. Statistics for all (Volume I) – S. M. Aherkar
7. Statistics: Theory, Methods and Applications- Sancheti,D.C. & Kapoor V.K
8. Business Statistics :An Applied Orientation- P.K. Viswanathan
9. Statistics and their applications to Commerce - Borddigton
10. Business Statistics- Reddy, C.R Deep Publications, New Delhi.
11. Statistics Problems and Solutions- Kapoor V.K.
12. Fundamentals of Statistics - Elhance.D.N
13. Statistics - Gupta B.N.
14. Practical Business Statistics - Croxton & Crowdory.
15. Statistics Concepts & Applications- Nabendu Pal & Sahadeb Sarkar
16. Business Statistics- J.K.Sharma
17. Business Statistics - R.S.Bharadwa
18. Business Statistics- G V Kumbhojkar, Phadke Publications, Kolhapur

B.Com.-III (Semester VI) Syllabus

Advanced Statistics- Paper II

(w. e. f. June 2021)

Course outcomes / Objectives

- C01 To get acquainted with game theory and its solution.
- C02 To get knowledge about techniques used in decision making.
- C03 To estimate critical activities and project duration.
- C04 To create simulation model using random numbers.

Syllabus:

Unit No.	Topic	Subtopics	No. of Periods
1	Game Theory	Two person zero sum games, minimax and Maximin principle, saddle point, mixed strategies, Rule of dominance, solution of 2x2 game by short cut method and graphical method. Examples.	15
2	Decision Theory	Decision making under certainty, Decision making under risk (EMV Criteria), EVPI, VPI Decision making under uncertainty- Laplace, Hurwicz, Alpha criteria, Maximin, minimax criteria, minimax regret criteria. Examples.	15
3	Network Analysis	Introduction, Network diagram, rules for constructing diagram, determination of critical path, Application of CPM and PERT. techniques. Examples.	15
4	Simulation	Introduction, use of simulation, steps in simulation study, advantages and disadvantages of simulation, Monte Carlo Simulation method. Examples.	15

Notes :

1. Use of soundless non-scientific calculators is allowed.
2. More stress should be given on commercial applications.

List of Reference books

- 1) Fundamentals of Applied Statistics by Gupta & Kapoor.
- 2) Operations Research by S.D. Sharma
- 3) Quantitative Techniques in Decision Making by J.K. Sharma
- 4) Operations Research by R.K. Gupta.
- 5) Statistical Methods by J.Medhi
- 6) Fundamentals Mathematical Statistics by Gupta & Kapoor.
- 7) Introduction to Mathematical Statistics by D.N.Elance.