UNIVERSITY OF JAMMU

NOTIFICATION
(10/July/ ADP/27)

It is hereby notified for the information of all concerned that the Vice-Chancellor, in anticipation to the approval of the Academic Council, has been pleased to authorize adoption of the revised Syllabi and Courses of Study in the subject of Statistics for B.A./B.Sc. I,II,III of Three Year (General) Degree Course for the examination to be held in the years as under alongwith %age of change:-

Adoption of the Revised Syllabi of Statistics B.A/B.Sc. Part I, II, III

Class	Part	For the Examinations to be held in the year	Paper	%age of Change
B.A/B.Sc.	Part III	2011, 2012	A&B	Less than 25% change
B.A/B.Sc.	Part I	2011, 2012 & 2013	A&B	100% change
B.A/B.Sc.	Part II	2012, 2013 & 2014	A&B	100% change
B.A/B.Sc.	Part III	2013, 2014 & 2015	A&B	100% change

The alternative question papers are required to be set as per the University regulation given as under:-

i). **If the change in the Syllabi and Courses of Study is less than 25%, no alternative Question paper will be set.**
ii). **if the change is 25% and above but below 50% alternative Question Paper be set for one year.**
iii). **If the change is 50% and above on whole scheme is changed, alternative Question Paper are set for two years.**

Sd/-
(DR. P.S. PATHANIA)
REGISTRAR

F.Acd./XXVI/10/ 4152-76
Dated: 16/7/2010

Annexure A

Syllabus and Courses of Study in Statistics for B. A. /B. Sc. (Part III) For the Examination to be held in the years 2011 and 2012

There shall be two theory papers and one practical paper of 50 marks each. Each theory paper and the practical paper shall be three hours duration. 20% of the marks shall be reserved for internal assessment in each theory paper and 50% in practical paper. Each theory paper will be set for 40 marks and the practical paper of 25 marks. In case of regular candidates, internal assessment received from the college will be added to the marks obtained by them in the university examination and in case of private candidates, marks obtained by them in the University examination shall be increased proportionally in accordance with the statutes/regulations.

PAPER A: APPLIED STATISTICS

Objectives: The main objective of this course is to provide knowledge to the students about applied statistics such as Indian applied statistics such as Indian applied statistics system, demographic methods, economic statistics and time series analysis.

Unit-I

Demographic Methods: Source of demographic data-census, register, adhoc survey, hospital records, demographic profiles of Indian census, Measurement of mortality and life table-crude death rates, infant mortality rate, measurement of fertility-crude birth rates, general fertility rate, total fertility rate gross reproduction rate, net reproduction rate.

Static laws of demand and supply, price elasticity of demand, analysis of income and allied size distribution, Pareto distribution, graphical test, fitting of Pareto law, lognormal distribution and its properties, Lorenz curve and estimation of elasticity from time series data, Gini's Coefficients.

Unit-IV

Time series Analysis:- Economic time series, its difference components, illustration, additive and multiplicative models, determination of trend ,Logistic and modified exponential growth curves, analysis of seasonal fluctuations, construction of seasonal indices, Autoregressive services of first and second order and correlogram.

Unit-V

Econometrics: Definition, scope and goals of econometrics; specification of the model; variables in mathematical form of the model, simple Regression. Analysis, stochastic and non-stochastic of relation, Estimation Regression. Parameters, Least square estimation and its properties.

Note for paper setting:

The question paper will contain two questions from each unit (total ten questions) and the candidates will be required to answer one question from each unit (total questions to e attempted, will be five) i.e. there will be internal choice within each unit.

1. Books Recommended

2. Croxton F.E. and Cowden D.J. (1969); applied general Statistics, prentice hall of india.
3. Goon A.M. gupta M.K. Das Gupta B. (1986): Fundamentals of Statistics, Vol. II, World Press Calutta.
4. Guide of current Indian official Statistics: Central Statistical Organization, Govt. of India, New Delhi.
5. Saluja M.P. () Indian official Statistical systems. Statistical Publishing Society, Calutta.
6. Srivatava O.S (1983); A text book of Demography, Vikas [illegible]

Syllabus and Courses of Study in Statistics for B. A. /B. Sc. (Part III) For the Examination to be held in the years 2011 and 2012

PAPER B: STATISTICAL QUALITY CONTROL AND COMPUTATIONAL TECHNIQUES

Objective: The main objective of this course is to provide knowledge to the students about statistical quality control and computational techniques.

Unit – I

Indian applied statistical system; Present official statistical system in India, Method of collection of official statistics, Role and Functions of MOSPI, CSO, NSSO and Directorate of Economics and Statistics of J&K Government. Importance of statistical methods in industrial research and practice, types of inspections, determination of tolerance limits.

Unit – II

General theory of control charts, cause of variation in quality, control limits, sub grouping, summary of out of control and criteria charts for attributes, np-chart, p-chart, c-chart, charts for variables: X and R- Charts, design of X and R charts versus P charts, process capability studies.

Unit – III

Principle of acceptance sampling:- Problem of lot tolerance, stipulation of good and bad lots, producers and consumer risks, single and double sampling plans their OC

numerical differentiation and integration, Trape ooidal rule, Simpson 1/3 3/8 and waddles formula, interactive solution of non-linear equations.

Unit – V

Linear Programming:- elementary theory of convex sets, definition of general LPP, formulation problem of LPP. Example of LPP, Problem occurring in various fields, Graphical and Simplex method of solving an LPP, Artificial variable, duality of LPP

Note For Paper Setting

The question paper will contain two questions from each unit (total ten questions) and the candidates will be required to answer one question from each unit (total questions to e attempted, will be five) i.e. there will be internal choice within each unit.

Books Recommended

1. Brownlee K.A. (1960): Statistical Theory and Methodology in Science and Engineering. John Wiley and sons
2. Grant E.L. (1964): Statistical quality control. McGraw Hill.
3. Duncan A.J. (1974); Quality control and Industrial Statistics. Taraporewala and sons.
4. Gass S.I. (1975) Linear Progamming methods and applications. Mc Graw Hill.
5. Rajaraman, V (1981): Computer Oriented Numerical Methods. Prentice hall.
6. Sastry S.S. (1987) : Introductory methods of numerical analysis. Prentice hall
7. Taha H.A. (1989): Operation Research: An Introduction. Macmillan Publishing Company.

8. Additional References
9. Broker H.A. and Liberman G.T. (1962): Engineering Statistics. Prentice Hall.
10. Cowden D.J (1960): Statistical Methods in Quality Control. Asia Publishing Society.
11. Gavin W.W. (1960): Introduction to linear programming. Mc Graw Hill
12. Mahajan M 2001): Statistical Quality C

Annexure B

Syllabus and Courses of Study in Statistics for B. A. /B. Sc. (Part I) For the Examination to be held in the years 2011, 2012 and 2013

There shall be two theory papers and one practical paper. Each theory paper and the practical paper shall be of three hours duration. 20% of the marks shall be reserved for internal assessment in each theory paper and 50% in practical paper. Each theory paper will be set for 40 marks and the practical paper of 25 marks. In case of regular candidates, internal assessment received from the college will be added to marks obtained by them in the university examination shall be increased proportionally in accordance with the statutes/regulations.

PAPER A: DISCRIPTIVE STATISTICS

Objectives: The Objectives of this course is to impart students the basic knowledge of measures of central tendencies and measure of dispersion along with the usefulness of correlation, regression coefficients and attributes.

Unit- I

Definitions, Scope and importance of statistics, General nature of statistical data, qualitative and quantitative data, discrete and continuous data, Primary and secondary data, classification & Tabulation, frequency distribution and their graphical and diagrammatic representations histogram, frequency curves, bar diagram, Ogive and measures of central tendency (A.M.,G.M.,H.M.) Median and mode, their merits and demerits.

Unit-II

Measures of Dispersion: Range. Inter Quartile range, Mean Deviation, Standard

Unit IV

Regression lines, regression coefficient and their properties. Principle of least squares, fitting of a straight line, parabola, logarithmic and exponential curve by the method of least squares.

Multivariate Data: Partial and multiple correlation coefficients of three variables only. (Derivations and simple illustrations)

Unit V

Theory of Attributes: Notation and terminology for attributes, contingency table, class frequency, ultimate class frequency, relationship between class frequencies, consistency of data, conditions for consistency of data. Association and independence of attributes: (up to three attributes)

Unit – I

Indian applied statistical system, present official statistical system in India. Method of collection of official statistics, Role and Functions of MOSPI, CSO, NSSO and Directorate of Economics and Statistics of J&K Government. Importance of statistical methods in industrial research and practice, types of inspections, determination of tolerance limits.

Books Recommended

1. Gupta and Kapoor: Fundamentals of Mathematical Statistics
2. Kapoor and Saxena: Mathematical Statistics
3. Goon, Gupta and Dass Gupta; fundamentals of Statistics vol-I
4. S.P. Gupta; Statistical Methods
5. Croxton F.E., Cowden D.J. and Kelin S; Applied General Statistics, Prentice Hall of India
6. Mood, A.M. Boes, D.C. and Graybill, F.A.: Introduction to the theory of statistics.

Unit – III

Principle of acceptance sampling:- Problem of lot tolerance, stipulation of good and bad lots, producers and consumer risks, single and double sampling plans their OC

Syllabus and Courses of Study in Statistics for B. A. /B. Sc. (Part III)

For the Examination to be held in the years 2011 and 2012

PAPER B: STATISTICAL QUALITY CONTROL AND COMPUTATIONAL TECHNIQUES

Objectives: The main objective of this course is to provide knowledge to the students about statistical quality control and computational techniques.

Note for paper setting:

The question paper will contain two Sections. Section A will contain compulsory five questions of 3 marks each, one question from each unit. Section B will contain 10 questions of 8 marks each, two questions from each unit and the candidates will be required to answer one question from each unit i.e. there will be internal choice within each unit of section B.

Unit – II

General theory of control charts, cause of variation in quality, control limits, sub grouping, summary of out of control and criteria charts for attributes, np-chart, p-chart, c-chart, charts for variables: X and R- Charts, design of X and R charts versus P charts, process capability studies.

Syllabus and Courses of Study in Statistics for B. A. /B. Sc. (Part I) For the Examination to be held in the years 2011, 2012 and 2013

PAPER B : PROBABILITY THEORY

Unit – I

Probability: Random experiment, events, algebra of events, sample space, definitions of Probability, simple illustrations for three events, conditional Probability, theorem on Probability of two events and its extension. Independent events, simple illustrations, Bayes Theorem and its applications.

Unit – II

Probability mass function and Probability density function, joint marginal and conditional pmf and pdf, Independence of random variables, Discrete and continuous random variables. Mathematical expectation, expectation of sum of two random variables and product of two independent random variables, conditional expectation and conditional variance, moment generating function and properties of mgf.

Unit – III

Discrete Probability distributions: Uniform distribution, its mean and variance, Bernoulli distribution, binomial distribution, its mean, variance, mode and mgf, recurrence relation for B.D. Definition, moments and mgf. Negative binomial distribution, Poisson distribution and and its moments. Poisson distribution as a limiting case of B.D., its mean, variance and mg, Recurrence relation of Poisson distribution ,Poisson distribution as a limiting case of negative B.D. recurrence formula for N.B.D. Hyper geometric distribution; its definition, mean, variance and relation with Binomial distribution.

Unit – IV

Rectangular distribution; Moments of rectangular distribution, mgf and mean deviation

Unit – V

Jacobian Transformation for one and two variables, Markov, Chebbychev and Jensens inequalies with proof and their simple illustrations. C.L.T. and weak laws of large numbers.

Note For Paper Setting

The question paper will contain two Sections. Section A will contain compulsory five questions of 3 marks each, one question from each unit. Section B will contain 10 questions of 5 marks each, two questions from each unit and the candidates will be required to answer one question from each unit i.e. there will be internal choice within each unit of section B.

Books Recommended

1. Mood, A.M. , Boes, D.C. and Graybill, F.A.: Introduction to the theory of statistics.
2. Hogg. R.V. and Graig, A. T. : Introduction to the mathematical statistics.
3. Saxena, H.C.; Finite Mathematics.
4. Lindren: Statistical Theory
5. Parzen: Modern Probability Theory
6. M.N. M urthy: Theory of Probability.
7. V.K. Rohatgi; Introduction to the theory of Probability

Note: There must be atleast 30 practicals exercises covering the topics of paper A & B.

Annexure C

Syllabus and Courses of Study in Statistics for B. A. /B. Sc. (Part II) For the Examination to be held in the years 2012, 2013 and 2014

There shall be two theory papers and one practical paper. Each theory paper and the practical paper shall be of three hours duration. 20% of the marks shall be reserved for internal assessment in each theory paper and 50% in practical paper. Each theory paper will be set for 40 marks and the practical paper of 25 marks. In case of regular candidates, internal assessment received from the college will be added to marks obtained by them in the university examination shall be increased proportionally in accordance with the statutes/regulations.

PAPER A: STATISTICAL INFERENCE

Objectives: the main objectives of this course is to provide knowledge to the students about the theory of estimation, obtaining estimates of unknown parameters using different methods, testing of Hypothesis, Test of significance and use of non-parametric test in the situations where parametric tests are not applicable. The utility and applications of sampling will also taught to them.

Unit- I

The concept of sampling distribution, sampling distribution of Chi Square, t and F with derivations, properties of these distributions and their inter relations.

Unit-II

Estimation: Problem of estimation; point estimation, interval estimation, criteria for a good estimator, unbiasedness, consistency, efficiency and sufficiency with examples

and variable, proportions and means, single sample, two samples (both paired and independent)

Unit IV

Small sample tests based on t, F and χ^2 and test based on normal distribution, confidence interval for single mean, difference of means and variance (only for normal case), NP Lemma, its applications to find most powerful in case of binomial. Poisson and normal distributions.

Unit V

Non- parametric tests: Concept of Non-parametric tests, advantages of Non-parametric tests over parametric tests. Sign test for single sample and two sample problems (for paired and independent samples) Wilcoxon-signed rank test, Mann-Whitney U-test, run test. Median test and test for independence based on Spearman's rank correlation.

Note for paper setting:

The question paper will contain two Sections. Section A will contain compulsory five questions of 3 marks each, one question from each unit. Section B will contain 10 questions of 5 marks each, two questions from each unit and the candidates will be required to answer one question from each unit i.e. there will be internal choice within each unit of section B.

Books Recommended

1. Goon, Gupta and Dass Gupta: An outline of statistical inference Vol-II
2. H.C. Saxena; Statistical inference.
3. Gibbons, J.D.: Non-parametric statistical inference.
4. Kendall and Stuart: The advanced theory of statistics Vol-II
5. Connor W.J.: Practical Non-parametric Inference
6. Hogg. V. and Craig A.T.: Introduction of Mathematical Statistics.
7. Mood and Graybill: an introduction to theory of Statistics.
8. Srivasta and Srivastava: Statistical Inference: Testing of Hypothesis

Syllabus and Courses of Study in Statistics for B. A. /B. Sc. (Part II) For the Examination to be held in the years 2012, 2013 and 2014

PAPER B: SAMPLING AND DESIGN OF EXPERIMENTS

Unit – I

Complete enumeration Vs sample enumeration; advantages and disadvantages of sample survey, objectives of sampling, principal steps in a sample survey, limitations of sampling, sampling and non sampling errors, types of sampling, probability sampling purposive sampling and mixed sampling, random numbers. Simple random sample from finite population, S.R.S. with & without replacement, sample mean as unbiased estimate of population mean, sampling variance as an unbiased estimate of population variance, merits and demerits of SRS. .

Unit – II

Meaning of Stratification, Method of Stratified sampling and its advantages and disadvantages. Mean and Variance of Stratified sampling Proportional allocation, optimum allocation, comparison of stratified random sampling with SRS.

Unit – III

Systematic sampling, Cluster sampling with equal and unequal cluster sizes, estimation of mean and variance.

Unit – IV

Analysis of variance for one way and two way classification, principles of design of experiment, randomization, replication and local control, concept and analysis of completely randomized design, randomized block design, advantages and disadvantages of these design

Unit – V

Concept and analysis of Latin Square design, one missing plot technique, Factorial

Books Recommended

1. F.S. Choudhary and Daroga Singh: Sampling Theory
2. Cochran W.J.: Sampling Technique
3. Sukhatme P.V. and Sukhatme B.V. : Sampling theory survey with applications.
4. Murty, M.N.: Sampling theory and methods
5. Honson and others: Sample survey methods and theory Vol-I
6. Gupta and Kapoor; fundamental of applied Statistics.
7. Fisher, R.A. ; Design of experiments
8. Phase V.G. and Sukhatme P.V. : Statistical methods of agricultural workers.
9. Umaraji, R.R.: Prob. And statistical methods.
10. Srivastava S.R.; applied statistics.
11. Goon, Gupta, Dass Gupta; Fundamentals of Statistics Vol-II

Note: There must be atleast 30 practical exercises covering the topics of paper A & B.

Annexure D

Syllabus and Courses of Study in Statistics for B. A. /B. Sc. (Part III) For the Examination to be held in the years 2013, 2014 and 2015

There shall be two theory papers and one practical paper of 50 marks each. Each theory paper and the practical paper shall be three hours duration. 20% of the marks shall be reserved for internal assessment in each theory paper and 50% in practical paper. Each theory paper will be set for 40 marks and the practical paper of 25 marks. In case of regular candidates, internal assessment received from the college will be added to the marks obtained by them in the university examination and in case of private candidates, marks obtained by them in the University examination shall be increased proportionally in accordance with the statutes/regulations.

PAPER A: APPLIED STATISTICS

Objectives: The main objective of this course is to provide knowledge to the students about applied statistics such as Indian applied statistics such as Indian applied statistics system, demographic methods, economic statistics and time series analysis.

Unit-I

Demographic Methods: Source of demographic data-census, register, adhoc survey, hospital records, demographic profiles of Indian census, Measurement of mortality and life table-crude death rates, infant mortality rate, measurement of fertility-crude birth rates, general fertility rate, total fertility rate gross reproduction rate, net reproduction rate.

Unit-II

distribution and its properties, Lorenz curve and estimation of elasticity from time series data, Gini's Coefficients.

Unit-IV

Time series Analysis:- Economic time series, its difference components, illustration, additive and multiplicative models, determination of trend ,Logistic and modified exponential growth curves, analysis of seasonal fluctuations, construction of seasonal indices, Autoregressive services of first and second order and correlogram.

Unit-V

Econometrics: Definition, scope and goals of econometrics; specification of the model; variables in mathematical form of the model, simple Regression. Analysis, stochastic and non-stochastic of relation, Estimation Regression. Parameters, Least square estimation and its properties.

Note for paper setting:

The question paper will contain two Sections. Section A will contain compulsory five questions of 3 marks each, one question from each unit. Section B will contain 10 questions of 5 marks each, two questions from each unit and the candidates will be required to answer one question from each unit i.e. there will be internal choice within each unit of section B.

Books Recommended

1. Croxton F.E. and Cowden D.J. (1969); applied general Statistics, prentice hall of india.
2. Goon A.M. gupta M.K. Das Gupta B. (1986): Fundamentals of Statistics, Vol. II, World Press Calutta.
3. Guide of current Indian official Statistics: Central Statistical Organization, Govt. of India, New Delhi.
4. Saluja M.P. () Indian official Statistical systems. Statistical Publishing Society, Calutta.
5. Srivatava O.S (1983); A text book of Demography, Vika...

Syllabus and Courses of Study in Statistics for B. A. /B. Sc. (Part III) For the Examination to be held in the years 2013, 2014 and 2015

PAPER B: STATISTICAL QUALITY CONTROL AND COMPUTATIONAL TECHNIQUES

Objective: The main objective of this course is to provide knowledge to the students about statistical quality control and computational techniques.

Unit – I

Indian applied statistical system; Present official statistical system in India, Method of collection of official statistics, Role and Functions of MOSPI, CSO, NSSO and Directorate of Economics and Statistics of J&K Government. Importance of statistical methods in industrial research and practice, types of inspections, determination of tolerance limits.

Unit – II

General theory of control charts, cause of variation in quality, control limits, sub grouping, summary of out of control and criteria charts for attributes, np-chart, p-chart, c-chart, charts for variables: X and R- Charts, design of X and R charts versus P charts, process capability studies.

Unit – III

Principle of acceptance sampling:- Problem of lot tolerance, stipulation of good and bad lots, producers and consumer risks, single and double sampling plans their OC functions, concept of AQL, LTPD, AOQL, average amount of inspection and ASN function. Rectifying inspection plan, Sampling Plan, Indian standard table part-I (including applications) I.S. 2500 Part-I .

Unit – IV

Note For Paper Setting

The question paper will contain two Sections. Section A will contain compulsory five questions of 3 marks each, one question from each unit. Section B will contain 10 questions of 5 marks each, two questions from each unit and the candidates will be required to answer one question from each unit i.e. there will be internal choice within each unit of section B.

Books Recommended

1. Brownlee K.A. (1960): Statistical Theory and Methodology in Science and Engineering. John Wiley and sons
2. Grant E.L. (1964): Statistical quality control. McGraw Hill.
3. Duncan A.J. (1974); Quality control and Industrial Statistics. Taraporewala and sons.
4. Gass S.I. (1975) Linear Progamming methods and applications. Mc Graw Hill.
5. Rajaraman, V (1981): Computer Oriented Numerical Methods. Prentice hall.
6. Sastry S.S. (1987) : Introductory methods of numerical analysis. Prentice hall
7. Taha H.A. (1989): Operation Research: An Introduction. Macmillan Publishing Company.

Additional References

8. Broker H.A. and Liberman G.T. (1962): Engineering Statistics. Prentice Hall.
9. Cowden D.J (1960): Statistical Methods in Quality Control. Asia Publishing Society.
10. Gavin W.W. (1960): Introduction to linear programming. Mc Graw Hill.
11. Mahajan M.2001): Statistical Quality Control . Dhanpat Rai and Co. (P)Ltd.
12. Rao S.S.(1984); Optimization Theory and Applications. Wiley Eastern.
13. Krishnamurthy E.V. and Sen S.K. (1976); Computer Based Numerical algorithms. Afiliated East-West Press.

Note: There must be atleast 30 practical exercises covering the topics of Paper A & B.