Department of Statistics, Govt. Degree College Baramulla (Autonomous)

Syllabus for 6th Semester (Statistics) NEP Batch 2022 and onwards   (Credit=4+2)

Paper-I (Major/Minor) Title: Operations Research -I   Code: ....

Course Objectives: To introduce Students:
- The basic elements of Operations Research
- The Theory and Practical applications of Linear Programing Problems.

Course Outcome: On successful completion of this course, the students will be able to:
- Understand the fundamentals of Operations Research and Linear Programing Problems.
- Apply different techniques of Linear Programing Problems and Transportation Problems to real life.

THEORY (4 Credits)

UNIT-I Introduction. (16 hrs)

Operations Research (OR): Introduction to Operations Research, its Development, Characteristics and Scope, Importance of Operations Research, Limitations of OR.

Linear Programming Problems (LPP): Introduction, basic concepts, critical region, basic and non-basic variables, convex set, basic solution, feasible solution, basic feasible solution, optimum solution, slack & surplus variables.

UNIT-II Linear Programming Problems. (16 hrs)

Linear Programming Problems: Mathematical formulation of LPP, Standard form of LPP, Matrix form of linear programing problem, Graphical method for solving LPP, Simplex Method for solving LPP.

UNIT-III Artificial Techniques and Duality in LPP (16 hrs)

Artificial variable techniques (Two-phase and Big-M method) for solving a general LPP.

Duality in Linear Programing Problem: Concept of duality in LPP, definition of primal-dual problem, matrix form of symmetric primal and its dual, general rules for converting any primal into its dual.

UNIT-IV Transportation Problem (16 hrs)

Transportation Problem (TP): Introduction, Mathematical formulation and Tabular representation. Concept of feasible, basic feasible and optimal solutions with reference to T.P. Methods for finding initial basic feasible solution (North- West Corner Rule, Lowest Cost Entry method, Vogel's Approximation method). Methods for obtaining optimal solutions to T.P. (MODI method).

Members:
1) Prof. Khurshhed Ahmad Khan......
2) Dr. Showkat Maqbool Ganai ......
3) Prof. Nisar Ahmad Khan ......
4) Dr. Rayees Ahmad Dar ......
5) Prof Mahnaz Shafi Chishti ......

Dr. Bilal Ahmad Sheikh
(Chairperson)

PRACTICAL (2 CREDITS)
Practicals based on:

1. Graphical and Simplex method for LPP.
2. Artificial variable techniques for LPP.
3. Methods of Transportation problem for finding its initial basic feasible solutions (North-West Corner Rule, Lowest cost entry, Vogel's Approximation method)
4. The methods for converting Primal into its Dual in LPP.
5. Transportation Problem for finding its optimum solution.

REFERENCES:

1. Gass S.I (1975): Linear Programming Methods and Applications, McGraw Hill.
2. P. K. Gupta and D.S. Hira (2009): Operations Research, S. Chand, New Delhi.
3. H.A. Taha (2009): Operations Research: An introduction, Person Prentice Hall.
4. Kapoor, V.K. and Kapoor,S. (2001): Operations Research Techniques for Management, Sultan Chand and Sons, New Delhi.
5. Wagner, H.M. (1982):Principles of operations research, with applications to management decisions, Prentice Hall of India, New Delhi.
6. S.D. Sharma (1994): Operations Research , Kidar Nain Ram Nain & Co, Meerut.
7. Kanti Swarup, P.K.Gupta, Manmohan: (Operations Research, Sultan Chand & Sons, New Delhi.

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Department of Statistics, Govt. Degree College Baramulla (Autonomous)

Syllabus for 6ᵗʰ Semester (Statistics) NEP Batch 2022 and onwards   **Credit = 4+2**

Paper-II (Major) Title: Statistical Inferences & Statistical Quality Control-I
Code: ....

Course objectives: To inculcate in students the understanding of Statistical inference and Statistical Quality Control.

Course Outcomes: On successful completion of this course the student will be able to comprehend:

- The basic concepts of theory of estimation, types of estimation with its applications in day to day life.
- The basic concepts of quality control and applications of different control charts for maintaining the quality of the products.
- The basic concepts of Sampling Inspection Plan and its different techniques to control the quality of the finished products

THEORY (04 Credits)

UNIT-I Theory of Estimation: (16hrs)
Introduction, Concept of Statistical Inference, Parameter, Parameter Space, Statistic and its sampling distribution, Types of Estimation (Point and Interval estimation), Estimate and estimator, Requirements of a good Estimator: Biasedness, Consistency, Efficiency and Sufficiency with related examples, Statement of Neyman-Factorization theorem (without proof) with examples.

UNIT-II Method of Estimation: (16hrs)
Introduction, types of estimation, concept of likelihood function, method of Maximum likelihood Estimation (MLE), method of Moments, method of Minimum Chi-Square, method of Least Square, examples on MLE and Method of moments only.

UNIT-III Control Chart for Variables: (16hrs)
Basic Concepts in SQC, chance causes, assignable causes, process control, product control, benefits of Statistical Quality Control.

Control Charts : Introduction, 3σ limits, Shewartz control chart for variables: $\bar{X}$ - Chart, R- chart, S-Chart and their interpretations.

UNIT-IV Control Chart for Attributes: (16hrs)
Control chart for attributes: Control Chart for Fraction Defective (p-chart), Control Chart for number of defectives (np-chart), Control Chart for number of defects per unit (C-chart) for uniform sample size.

Concept of single Sampling Plan, Acceptance Sampling Inspection Plan: Introduction, Acceptable Quality Level (AQL), Lot Tolerance Proportion or Percentage Defective (LTPD), Process Average Fraction Defective, Consumer's Risk and Producer's Risk (only concepts).

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PRACTICAL (02 CREDITS)

Practical Based on:
1. Construction of $\overline{X}$ - Chart.
2. Construction of Range Chart (R-Chart).
3. Construction of Standard deviation chart(S-Chart).
4. Construction of np-chart.
5. Construction of p-chart.
6. Construction of c-chart.

REFERENCES:
1. S.C. Gupta and V.K Kapoor: Fundamentals of Applied Statistics, S. Chand, New Delhi.
2. Grant E.L (1964): Statistical Quality Control, McGraw Hill.
3. Duncan A.J (1974): Quality Control and Industrial Statistics, Tarapolwal and Sons.
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6. Brownlee K.A (1960): Statistical Theory and Methodology in Science and Engineering, John Wiley and Sons.
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Syllabus for 6th Semester (Statistics) NEP Batch 2022 and onwards   **Credit=2**
Paper-III (Major)   **Title: Internship-II**   **Code:.................**

Course objectives: To inculcate in students the understanding and the applications of various tools of Statistics in real life problems.

Course Outcome: On successful completion of this course the students will be able to:

- Use different Statistical tools for collection of data related to the problems undertaken for its presentation, analysis and interpretations
- Undertake different day to day life activities prevailing in the society for its critical analysis and drawing valid conclusions.

Internship (2 Credits)

Internship based upon the topics which have relevance in the practical applications to our day to day life problems. Higher objectives will be studied and analysed in this internship. The student has to submit the detailed report to the concerned department.

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