



DEPARTMENT OF STATISTICS

Syllabus of
Bachelor's Degree in
STATISTICS

CHOICE BASED CREDIT SYSTEM
SEMESTER SCHEME
UNDER NEW EDUCATION POLICY 2020
2021-22 ONWARDS

Approved by the BOS meeting held on 17th November 2021
Approved by the Academic Council meeting, held on 10-12-2021



1. Preamble of the Programme

The BOS in Statistics of S.D.M College(Autonomous),Ujire has framed and proposed the syllabi for I and II semester B.Sc.(Basic/Hons) and M.Sc.(Statistics) with Statistics subject as one of the major(s)as per the Regulations Governing the Choice Based Credit System (CBCS) Semester Scheme with Multiple Entry and Exit Options in the Undergraduate, and Postgraduate Degree Programmes under the Faculty of Science from the academic year 2021-2022.The titles of the Core papers and elective papers have been listed as per the Karnataka State Higher Education Council (KHSC) Statistics model syllabus prepared by Statistics subject expert committee.

Statistics as the technology of data analysis and decision making under uncertainty has expandedvastly in the past few decades. It's descriptive and inferential rolesnot only formulate the basis of growth of almost all the disciplines of the contemporary world but also provide an array of employment avenues in industry, academia, computer software companies, government and R&D organizations. Candidates successfully completing the B.Sc.(Honors) or B.Sc. and M.Sc. in Statistics program will have good knowledge and expertise to work as statistical consultant for the analysis of all kinds of data, pursue Ph.D. in Statistics, work in software industry as domain experts and use the Statistical Knowledge effectively in academic institutions, Industry, Government and Research Institutions.

2. Eligibility for Admission to B.Sc.Statistics (Basic/Hons) and M.Sc. (Statistics):

- Only those Candidates who have passed 10+2 level or equivalent with Mathematics as one of the subjects are eligible for admission to B.Sc. Statistics.
- Candidates must opt Mathematics as one of the majors along with Statistics during first two years(I toIV semesters of the undergraduate(UG Programme) are eligible for admission to M.Sc. Statistics

Programme Outcomes(POs)

By the end of the program the students will be able to:

1. Acquire fundamental/systematic or coherent understanding of the academic field of Statistics and itsdifferent learning areas and applications.
2. Develop and demonstrate an ability to understand major concepts in various disciplines of Statistics.
3. Demonstrate the ability to use skills in Statistics and different practicing areas for formulating and tackling Statistics related problems, identifying and applying



appropriate principles and methodologies to solve a wide range of problems associated with Statistics.

4. Understand procedural knowledge that creates different types of professionals related to subject area of Statistics, including professionals engaged in government/public service and private sectors.
5. Plan and execute Statistical experiments or investigations, analyze and interpret data/information collected using appropriate methods, including the use of appropriate statistical software including programming languages, and report accurately the findings of the experiment/investigations.
6. Have a knowledge regarding use of data analytics tools like Excel and R-programming.
7. Developed ability to critically assess a standard report having graphics, probability statements.
8. Analyze, interpret the data and hence help policy makers to take a proper decision.
9. Recognize the importance of statistical modeling and computing to analyze the real problems using various statistical tools.
10. Demonstrate relevant generic skills and global competencies such as
 - (i) Problem-solving skills that are required to solve different types of Statistics related problems with well-defined solutions, and tackle open-ended problems, that belong to the disciplinary-area boundaries;
 - (ii) Investigative skills, including skills of independent thinking of Statistics-related issues and problems;
 - (iii) Communication skills involving the ability to listen carefully, to read texts and reference material analytically and to present information in a concise manner to different groups/audiences of technical or popular nature;
 - (iv) Analytical skills involving paying attention to details and ability to construct logical Arguments using correct technical language related to Statistics and ability to translate them with popular language when needed;
 - (v) ICT skills;
 - (vi) Personal skills such as the ability to work both independently and in a group.



11. Undertake research projects by using research skills- preparation of questionnaire, conducting sample survey, research projects using sample survey, sampling techniques.
12. Understand and apply principles of least squares to fit a regression model to the given data, study the association between the variables, applications of Probability Theory and Probability Distributions.

3. Assessment

Weightage for assessments (in percentage)

Type of Course	Formative Assessment/IA	Summative Assessment
Theory	40	60
Practicals	20	30(25+05(For Record book))
Projects	40	60
Experimental Learning (Internships, etc.)	40	60

4. Programme Structures with options

The programmes are flexible enough to allow liberty to students in designing them according to their requirements.

- Students choose Two Major subject/disciplines along with Languages, Generic Electives, Ability Enhancement, Skill Development and Vocational courses, including Extracurricular Activities.
- **Exit with Certificate** upon the Successful Completion of the First Year with 50 credits (Two Semesters) of the multidisciplinary Four-year Undergraduate Programme/Five-year Integrated Master's Degree Programme.
- **Exit with Diploma** upon the Successful Completion of the Second Year with 100 credits (Four Semesters) of the multidisciplinary Four-year Undergraduate Programme/Five-year Integrated Master's Degree Programme.
- **Exit with Basic Bachelor Degree** at the Successful Completion of the Third Year with 142- 146 credits (Six Semesters) of the multidisciplinary Four-year Undergraduate Programme /Five-year Integrated Master's Degree Programme.
- **Exit with Bachelor Degree with Honours** in a Discipline at the Successful Completion of the Fourth Years with 184-188 credits (Eight Semesters) of the multidisciplinary Four-year Undergraduate Programme/Five-year Integrated Master's Degree Programme.



CURRICULUM

Programme : B.Sc/ B.Sc(Honors)

Discipline Core: STATISTICS Total credit:Effective from : 2021-22

Curriculum Structure for UG Progrm B Sc

B.Sc. I / II sem STATISTICS

Discipline Specific Core Courses (DSCC)

Sem	Subject /Code	Theory/ Practical	Credits	Work load/ week	Syllabus Hours	Duration of Exam	IA Marks	SEM	Total Marks
I	Descriptive Statistics	Theory	04	04 Hrs	56	03	40	60	100
		Pract	02	04 Hrs	52	03	25	25	50
II	Probability and Distributions	Theory	04	04 Hrs	56	03	40	60	100
		Pract	02	04 Hrs	52	03	25	25	50

Open Elective Course (OEC)

Sem	Subject / Code	Theory / Practical	Credits	Work load/ week	Syllabus Hours	Duration of Exam	IA Marks	SEM	Total Marks
I	Statistical Methods	Theory	03	03 Hrs	42	03	40	60	100
II	Business Statistics	Theory	03	03 Hrs	42	03	40	60	100

Skill Enhancement Course (SEC)

Sem	Subject / Code	Theory / Practical	Credits	Work load week	Syllabus Hours	Durationof Exam	IA Marks	SEM	Total Marks
I	Digital Fluency	Practical	02	04 Hrs	30	03	20	30	50



**Detailed Syllabus for Semesters I B.Sc. Statistics Course Content of
Semester– I
Descriptive Statistics**

Course Title: Descriptive Statistics	Course Credits:4
Total Contact Hours:56	Duration of ESA: 2 hours
Formative Assessment Marks:40	Summative Assessment Marks:60

Title of DSC A1/B1: Descriptive Statistics

Number of Theory Credits	Number of lecture hours/semester	Number of practical Credits	Number of practical hours/semester
04	56	02	52

Theory Content of DSC A1/B1		56 hrs
Unit–1:Introduction to Statistics		13 hrs
Statistics: Definition and scope. Data: quantitative and qualitative, cross sectional and time-series, discrete and continuous variable. Scales of measurement :nominal, ordinal, interval and ratio. Data organization, Visualization: Tabular and graphical. Frequency distributions, cumulative frequency distributions and their graphical representations. Stem and leaf displays. Concepts of population and sample. Methods of sampling- SRS, Stratified, Systematic and Cluster sampling methods: definitions only.		
Unit–2:Univariate Data Analysis		18 hrs
Concept of measures of central tendency : Arithmetic Mean, weighted mean, trimmed mean, Median, Mode, Geometric and harmonic means, properties, merits and limitations, relation between these measures. Measures of dispersion: Range, Quartile deviation, Mean deviation, Standard deviation and their relative measures. Gini’s Coefficient, Lorenz Curve. Moments, Skewness and Kurtosis. Partition Values and measures based on them. Box Plot. Outliers.		



Unit –3:Bivariate Data Analysis	12 hrs
Bivariate Data-,Correlation: Meaning, Types. Methods- Scatter plot,Karl Pearson’s correlation coefficient, Rank correlation: Spearman’s and Kendall’s measures. Functional relation between the variables,concept of errors, principle of least squares, Simple linear regression and its properties. Fitting of linear regression line and coefficient of determination their interpretation. Fitting of polynomial and exponential curves.	
Unit –4:Multivariate Data Analysis	13 hrs
Analysis of Categorical Data: Contingency table, independence and association of attributes, measures of association-odds ratio, Pearson’s and Yule’s measure, Multivariate Frequencies, Multivariate Data Visualization, mean vector and dispersion matrix, Multiple linear regression,multiple and partial correlation coefficients. Residual variance.	

Self -Study Components :

- Types of data – Primary data and secondary data
- Preparation of Questionnaire for Sample Surveys using google forms.
- Basic Data Visualization Tools.

References

1. Agresti,A.(2010).Analysis of Ordinal Categorical Data,2nd Edition,Wiley.
2. Anderson T.W.and Jeremy D.Finn(1996).The New Statistical Analysis of Data,Springer
3. Freedman,D.,Pisani,R.andPurves,R.(2014).Statistics,4thEdition,W.W.Norton & Company.
4. Gupta,S.C.(2018).Fundamental of Statistics, Himalaya Publishing House,7thEdition.
5. Gupta S.C. and V.K. Kapoor (2020). Fundamental of Mathematical Statistics, Sultan Chandand Co. 12thEdition.
6. Hogg, R. V. McKean J. W. and Craig, A. T. (2012). Introduction toMathematical Statistics,Pearson 7thEdition.
7. Joao Mendes Moreira,Andre CPL Fde Carvalho,Tomas Horvath(2018).General Introduction to Data Analytics, Wiley.
8. Johnson, R.A. and Bhattacharyya, G.K. (2006). Statistics: Principles and methods. 5thEdition,John Wiley & Sons, New York.
9. Medhi,J.(2005).Statistical Methods,New Age International.



10. Ross, S.M. (2014). Introduction to Probability and Statistics for Engineers and Scientists, 5th Edition, Academic Press.
11. Tukey, J.W. (1977). Exploratory Data Analysis, Addison-Wesley Publishing Co.

Pedagogy

- The course is taught using traditional chalk and talk method using problem solving through examples and exercises.
- Students are encouraged to use resources available on open sources.

Formative Assessment: Total 30 marks	
Assessment Occasion/type	Marks
Internal Test 1	15
Internal Test 2	15
Assignment/Seminar/ Data Analysis(07 marks)+Attendance(3marks)	10
Total	40

Practical Content based on DSCA1/B1

(Carrying-out all the practicals manually as well as using Excel spread sheet)

1. Presentation of data by frequency tables, diagrams and graphs, stem and leaf, partition values.
2. Arithmetic Mean (AM), geometric mean, harmonic mean, weighted AM, trimmed mean, corrected mean.
3. Mode, median, partition values.
4. Absolute and relative measures of dispersion, Boxplots.
5. Problems on moments, skewness and kurtosis.
6. Fitting of curves by least squares method.
7. Product moment correlation coefficient and rank correlation.
8. Fitting Simple Linear Regression
9. Partial and Multiple correlation.
10. Problems on Association of attributes.



Course Content of Semester–II
Probability and Distributions-I

Course Title: Probability and Distributions-I	Course Credits:4
Total Contact Hours: 56	Duration of ESA:2hours
Formative Assessment Marks:40	Summative Assessment Marks:60

Title of DSCA2/B2: Probability and Distributions-I

Number of TheoryCredits	Number of Lecture hours/semester	Number of practicalCredits	Number of Practical hours/semester
04	56	02	52

Theory of Content DSCA2/B2		56 hrs
Unit–1 :Probability		14hrs
Probability: Introduction, random experiments, sample space, events and algebra of events. Definitions of Probability– classical, statistical, and axiomatic. Conditional Probability, laws of addition and multiplication, independent events, theorem of total probability, Bayes’ theorem and its applications.		
Unit–2:Random variables, Mathematical Expectation and Generating Functions		14hrs
Random variables:discrete and continuous randomvariables,p.m.f.,p.d.f.and c.d.f., Illustrations,univariate transformations with illustrations. Mathematical Expectation and Generating Functions: Expectation of single random variables and its properties.Momentsand cumulants,moment generating function,cumulant generating function,probability generating functions(p.g.f.).Probability inequalities(Markov’sand Chebychev’s).		
Unit–3:Standard Discrete and Continuous distributions		18hrs
Standard discrete probability distributions: Bernoulli, Binomial, Poisson, Geometric- Mean, Variance, Recurrence relation for the central moments, limiting properties, Relationship between distributions, Fitting of Binomial an Poisson distributions. Standardcontinuous probability distributions: Uniform, Gamma, Normal-Mean, Variance, Properties, Fitting of Normal distributions. Applications of discrete andcontinuous		



distributions.	
Unit –4:Data Analysis Using R	12hrs
<p>Introduction to R: R as a calculator, statistical software and a programming language, R preliminaries, getting help, data inputting methods(direct and importing from other spread sheet applications like Excel), data accessing, and indexing, packages, Graphics in R, built in functions, saving, storing and retrieving work. Descriptive statistics:, measures of central tendency (mean, median and mode), partition values, measures of dispersion (range, standard deviation, mean deviation and inter quartile range), summaries of a numerical data, skewness and kurtosis.</p> <p>Creating avector using c (), reg() and Colon operator-Functions to summarize a vector sum mean, sd, median etc. Extrating a subset from the vectir (by index, by property) Introduction to plotting, plot(), lines(), Abline(), Barplot, Pie chart and Histogram-Box plot, Scatter Plot andfitting simple linear regression.</p> <p>Probability Distributions: R as a set of statistical tables- cumulative distribution, probability density function, quantile function, and simulate from the distribution, plotting probability curves for standard distributions.</p>	

Self Study-

- Covariance, Correlation coefficient for Bivariate Probability distributions
- Plotting graphs of Various Probability Distribution using R
- Discrete uniform Distribution
- Negative Binomial Distribution
- Hypergeometric Distriution
- gg plot package in R

References

1. Dudewitz.E.J.and Mishra.S.N.(1998).Modern Mathematical Statistics.JohnWiley.
2. Goon A.M.,Gupta M.K.,Das Gupta.B.(1991),Fundamentals ofStatistics,Vol.I,World Press, Calcutta.
3. Hogg R,V.,Mckean J.W, and Craig,A.T(2019).Introduction to mathematical Statistics,8th Edition,Pearson Education, New Delhi.
4. Hogg,R.V.,Tanis,E.A.andRaoJ.M.(2009).Probability and StatisticalInference,Seventh Edition, Pearson Education, New Delhi.



5. Mood, A.M., Graybill, F.A. and Boes, D.C. (2007). Introduction to the Theory of Statistics, 3rd Edition. (Reprint), Tata McGraw-Hill Pub. Co. Ltd.
6. Ross, S. (2002), A First Course in Probability, Prentice Hall.
7. Sudha G. Purohit, Sharad D. Gore, Shailaja R. Deshmukh, (2009). Statistics Using R, Narosa Publishing House.
8. Emmanuel Paradis (2005). R for Beginners (available at https://cran.rproject.org/doc/contrib/Paradisrdebut_en.pdf)

Pedagogy

- The course is taught using traditional chalk and talk method using problem solving through examples and exercises.
- Students are encouraged to use resources available on open sources.

Formative Assessment: Total 30marks	
Assessment Occasion/type	Marks
Internal Test 1	15
Internal Test 2	15
Assignment/Seminar/ Data Analysis (7marks)+Attendance(3marks)	10
Total	40



Content of Practical Course 2: List of Experiments to be conducted

(Computing all the practicals manually and using Excel/R)

1. Two exercise on Descriptive statistics (Presentations, Summarizations, correlations, regression and Graphs using R)
2. Computing probability: using addition and multiplication theorems.
3. Conditional probability and Bayes' theorem.
4. Problems on pmf, expectation, variance, quantiles, skewness, kurtosis (Discrete Case).
5. Problems on pdf, expectation, variance, quantiles, skewness, kurtosis (Continuous case).
6. Problems on discrete probability distributions(Binomial and Poisson)
7. Problems on Normal probability distributions
8. Computation of Moments
9. Fitting of distributions Binomial, Poisson, Normal distributions.
10. Generation of random samples. (Binomial, Poisson, Normal distributions)



Detailed Syllabus of Open Elective Courses for I and II Semesters

OE-1: Statistical Methods and Applications

Course Title: Statistical Methods and Applications	Course Credits:3
Total Contact Hours: 42	Duration of ESA: 2 hours
Formative Assessment Marks:40	Summative Assessment Marks:60

Number of Theory Credits	Number of lecture hours/semester	Number of practical Credits	Number of practical hours/ semester
03	42	-	-

Course Objectives

- This is an open elective course for other than statistics students.
- The students will learn the elements of descriptive statistics, probability, statistical methods such as tests of hypotheses, correlation and regression.

Course Outcomes

Students will be able to

CO-1.Acquire knowledge of statistical methods.

CO-2. Identify types of data and visualization, analysis and interpretation.

CO-3.Learn elementary probability and probability models.CO-4.Learn to apply test procedures for given dataset.

Pedagogy

The course is taught using traditional chalk and talk method using problem solving through examples and exercises.

Students are encouraged to use resources available on open sources.



Course Contents

Unit1: Introduction

10Hours

Definition and scope of Statistics. Data: quantitative and qualitative, attributes, variables, scales of measurement: nominal, ordinal, interval and ratio. Presentation: tabular and graphic, including histogram and ogives. Concepts of population and sample. Sampling from finite population

.Simple random sampling, Stratified and systematic random sampling procedures (definitions and methods only). Concepts of sampling and non-sampling errors.

Unit2: Univariate and Bivariate Data Analysis

10Hours

Measures of Central Tendency: mathematical and positional. Measures of Dispersion: range, quartile deviation, standard deviation, coefficient of variation, moments, skewness and kurtosis. Bivariate data, scatter diagram, Correlation, Karl-Pearson's correlation coefficient, Rank correlation. Simple linear regression, principle of least squares.

Unit3: Probability and Distributions

12 Hours

Probability :Random experiment, trial, sample space, events- mutually exclusive and exhaustive events. Classical, statistical and axiomatic definitions of probability, addition and multiplication theorems, Bayes theorem (only statements). Discrete and continuous random variables, probability mass and density functions, distribution functions, expectation of a random variable. Standard univariate distributions: Binomial, Poisson and Normal distributions (Elementary properties and applications only).

Unit4: Sampling Distributions and Testing of Hypothesis

10 Hours

Distribution of sample mean from a normal population, Chi-square, t and F distributions (No derivations) and their applications. Statistical Hypothesis : null and alternative hypothesis, Simple and composite hypothesis. Type I and Type II errors, level of significance, critical region, P-value and its interpretation. Test for single mean, Test for single proportion and equality of proportion equality of two means, single variance and equality of two variances for normal populations.



References

1. Daniel, W.W.(2007) Biostatistics-A Foundation for Analysis in the Health Sciences, Wiley
2. T.W.Anderson and Jeremy D.Finn(1996).The New Statistical Analysis of Data, Springer.
3. Mukhyopadyaya P(1999).Applied Statistics, New Central book Agency, Calcutta.
4. Ross, S.M.(2014) Introduction to Probability and Statistics For Engineers and Scientists.
5. Cochran, WG (1984): Sampling Techniques, Wiley Eastern, New Delhi.
6. S.C Gupta, V.K Kapoor: Fundamentals of Mathematical Statistics



OE-2: Business Statistics

Course Title: Business Statistics	Course Credits:3
Total Contact Hours: 42	Duration of ESA: 2 hours
Formative Assessment Marks:40	Summative Assessment Marks:60

Number of TheoryCredits	Number of lecture hours/semester	Number of practical Credits	Number of practical hours/semester
03	42		

Course Objectives

- Provide an introduction to basics of statistics within a financial context.
- To enable students to use statistical techniques for analysis and interpretation of businessdata.

Course Outcomes (COs)

Upon the completion of this course students should be able to:

CO1.Frameandformulatemanagementdecisionproblems.

CO2.Understandthebasicconceptsunderlyingquantitativeanalysis.

CO3.Usesoundjudgmentintheapplications of quantitative methods to management decisions.

Pedagogy

The course is taught using traditional chalk and talk method using problem solving through examples and exercises.

Students are encouraged to use resources available on open sources.

Course Contents

Unit1: Statistical Data and Descriptive Statistics 12 Hours

Nature and Classification of data: univariate, bivariate and multivariate data; time-series and cross-sectional data. Measures of Central Tendency: mathematical averages



including arithmetic mean geometric mean and harmonic mean, properties and applications. Positional Averages Mode and Median (and other partition values including quartiles, deciles and percentiles).

Measures of Variation: absolute and relative. Range, quartile deviation, mean deviation, standard deviation, and their coefficients, Properties of standard deviation/variance

Skewness: Meaning, Measurement using Karl Pearson and Bowley's measures ;Concept of Kurtosis.

Unit2: Simple Correlation and Regression Analysis

10 Hours

Correlation Analysis: Meaning of Correlation: simple, multiple and partial; Correlation and Causation, Scatter diagram, Pearson's co-efficient of correlation; calculation and properties(Proof not required). Correlation and Probable error; rank correlation.

Regression Analysis: Principle of least squares and simple linear regression(SLR).Fitting of Simple Linear Regression and interpretation. Properties of regression coefficients; Standard Error of Estimate and its use in interpreting the results.

Unit3: Index Numbers

10 Hours

Definition, Problems involved in the construction of index numbers, methods of constructing index numbers of prices and quantities, simple aggregate and price relatives method, weighted aggregate and weighted average of relatives method, important types of weighted index numbers: Laspeyre's, Paasche's, Bowley's, Marshall- Edgeworth, Fisher's, method of obtaining price and quantity index numbers, tests consistency of index numbers, time reversal test and factor reversal test for index numbers, Uses and limitations of index numbers. Consumer price index number: Problems involved in the construction of cost of living index number, advantages and disadvantages, Aggregative expenditure method and Family budget method for the construction of consumer price index numbers. Applications of Cost of Living Index numbers. Definition and measurement of Inflation rate—CPI and GNP Deflator.

Unit4:Time Series Analysis

10 Hours

Introduction, definition and components of Time series, illustrations, Additive, Multiplicative and mixed models, analysis of time series, methods of studying time



series: Secular trend, method of moving averages, least squares method–linear, quadratic, exponential trend fittings to the data. Seasonal variation- definition, illustrations, measurements, simple average method, ratio to moving average method, Cyclical variation definition, distinction from seasonal variation, Irregular variation- definition, illustrations.

References

1. Levin, Richard, David S. Rubin, Sanjay Rastogi, and H M Siddiqui. Statistics for Management. 7th ed., Pearson Education.
2. David M. Levine, Mark L. Berenson, Timothy C. Krehbiel, P. K. Viswanathan, Business Statistics: A First Course, Pearson Education.
3. Siegel Andrew F. Practical Business Statistics. Mc Graw Hill Education.
4. Gupta, S. P., and Archana Agarwal. Business Statistics, Sultan Chand and Sons, New Delhi.
5. Vohra N. D., Business Statistics, McGraw Hill Education.
6. Murray R Spiegel, Larry J. Stephens, Narinder Kumar. Statistics (Schaum's Outline Series), Mc-Graw Hill Education.
7. Gupta, S. C. Fundamentals of Statistics. Himalaya Publishing House.
8. Anderson, Sweeney, and Williams, Statistics for Students of Economics and Business, Cengage Learning.



Elective Paper offered by the Department of Statistics for the First Semester

Sl. No.	Paper	Unit	Relevance/Self Learning Components
1.	Statistics for Management Science		<ul style="list-style-type: none">• Powerful tool in decision making process.• Allocate resources more effectively and enables them to better optimize the performance of their businesses.

Self Study Components:

Unit I –

Phases of Operations Research

Unit III –

Live examples of Transportation problems

Unit IV-

Problems involved in Inventory Managements.



OE -2: Statistics for Management Science

Course Title :Statistics for Management Science	Course Credits:3
Total Contact Hours:42	Duration of ESA: 2 hours
Formative Assessment Marks:40	Summative Assessment Marks:60

Number of Theory Credits	Number of lecture hours/ semester	Number of practical Credits	Number of practical hours/ semester
03	42		

Course Objectives:

- Able to understand the concept of OR, phases of OR, LPP.
- Able to understand the concept of T.P. and A.P
- To understand the applications of different EOQ models

Course Outcomes:

- CO1: Students are able to construct LPP and solving through graphical, simplex method, big M method and Two phase method
- CO2: Able to understand the concept of Transportation problem and Assignment problems
- CO3: Learners are Familiar with Deterministic and problematic inventory models
- CO4: Students are able to use different EOQ models

Pedagogy

- The course is taught using traditional chalk and talk method using problem solving through examples and exercises.
- Students are encouraged to use resources available on open sources.

UNIT I

Introduction to Operations Research, phases of O.R.,Linear Programming Problem- basic concepts, Mathematical formulation of the L.P.P, graphical solutions of a L.P.P.

(10hrs)



UNIT II

Concepts of slack, surplus, artificial variables – Big-M method and Two phase method. Obtaining optimum solution to a L.P.P using Simplex method. Concept of duality in L.P.P. (10hrs)

UNIT III

Transportation Problem: Initial solution by North West corner rule, Least cost method and Vogel's approximation method (VAM), MODI's method to find the optimal solution. (10hrs)

UNIT IV

Assignment problem: Hungarian method to find optimal assignment.

Game theory: Rectangular game, minimax - maximin principle, solution to rectangular game, dominance property to reduce the game matrix.

Inventory Models: Meaning, advantages, costs involved in inventory. EOQ Models - with and without shortages. (12 hrs)

References:

1. Taha, H. A. (2007): Operations Research: An Introduction, 8th Edition, Prentice Hall of India.
2. SwarupKanti, Gupta, P.K. and Manmohan (2007): Operations Research, 13th Edition, Sultan Chand and Sons.
3. Ravindran, A, Phillips, D.T., Solberg, J.J. (2005): Operations Research- Principles and Practice, John Wiley & Sons.
4. P.K. Gupta and D.S. Hira : Operations Research, 17th Edition, S Chand and Company Ltd.

