Re-Accredited 'B++' 2.86 CGPA by NAAC
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વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
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–: <u>પરિપત્ર</u> :–

વાણિજય વિદ્યાશાખા હેઠળની સંલગ્ન તમામ કોલેજોના આચાર્યશ્રીઓને જણાવવાનું કે, NEP-2020 અંતર્ગત શૈક્ષણિક વર્ષ ૨૦૨૪–૨૫ થી અમલમાં આવનાર B.Com.Statistics Sem.-3 & 4 Major,Minor, MDC અને SEC ના અભ્યાસક્રમ સંદર્ભે આંકડાશાસ્ત્ર વિષયની અભ્યાસ સમિતિની તા.૦૨/૦૪/૨૦૨૪ ની સભા ના ઠરાવ ક્રમાંકઃ ૦૨ અન્વયે કરેલ ભલામણ વાણિજય વિદ્યાશાખાના અધ્યક્ષશ્રીએ વાણિજય વિદ્યાશાખાની મંજૂરીની અપેક્ષાએ વાણિજય વિદ્યાશાખાવતી વાણિજય વિદ્યાશાખાનાં અધરધેન ડીનશ્રીએ મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ એકેડેમિક કાઉન્સિલની તા.૦૧/૦૩/૨૦૨૪ની સભાના ઠરાવ ક્રમાંક :૧૦૪ અન્વયે માન.કુલપતિશ્રીને આપેલ સત્તા અંતર્ગત માનનીય કુલપતિશ્રી દ્વારા મંજૂર કરેલ છે.જેનો અમલ કરવા આથી જાણ કરવામાં આવે છે.

<u>આંકડાશાસ્ત્ર વિષયની અભ્યાસ સમિતિની તા.૦૨/૦૪/૨૦૨૪ ની સભાના ઠરાવ ક્રમાંકઃ૦૨</u>

:: આથી ઠરાવવામાં આવે છે કે, NEP-2020 અંતર્ગત શૈક્ષણિક વર્ષ ૨૦૨૪–૨૫ થી અમલમાં આવનાર S.Y.B.Com. Sem.- 3 & 4 Major, Minor, MDC અને SEC નો આંકડાશાસ્ત્ર વિષયનો અભ્યાસક્રમ સર્વાનુમતે મંજૂર કરી તે મંજૂર કરવા વાણિજય વિદ્યાશાખાને ભલામણ કરવામાં આવે છે.

(બિડાણઃ ઉપર મુજબ)

ક્રમાંક : એસ./સિલેબસ/પરિપત્ર/૯૬૨૧/૨૦૨૪
તા. ૦૩–૦૫–૨૦૨૪

કુલસચિવ

પ્રતિ,
૧) વાણિજય વિદ્યાશાખા હેઠળની સંલગ્ન તમામ કોલેજોના આચાર્યશ્રીઓ,
..... આપશ્રીની કોલેજના સંબંધિત શિક્ષકો/વિદ્યાર્થીઓને જાણ કરી અમલ કરવા સારૂ.
૨) અધ્યક્ષશ્રી, વાણિજય વિદ્યાશાખા,
૩)પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ.ગુ.યુનિવર્સિટી, સુરત.
.....તરફ જાણ તેમજ અમલ સારૂ.

STATISTICS SYLLABUS FOR

S.Y.B.COM SEM3 &4

UNDER

NEP-2020

S.Y.B.COM

Semester -III

Statistics Paper 2: Numerical Analysis (Major Paper 2) - Credit 4

Course Outcomes (COs)

On completion of the course, the students will be able to:

CO1	Understand the advance concept of finite difference and interpolation for both equal and unequal intervals.
CO2	Understand relation between numerical differentiation and integration.
CO3	Understand Newton Forward and Backward method and its application.
CO4	Understand basic concepts of finding roots and the methods of finding roots.
CO5	Apply the course content for the further study of statistics.

OBJECTIVE

The main objective of this course is to provide fundamental knowledge of finite difference, interpolation, numerical differentiation, numerical integration and iterative methods of finding roots and its procedures. The students should be able to understand the concept so that they can use it for the real life practical problem.

Sr.No.	Course Inputs (As per UGC Model Curriculum)	Weightage	Marks
Unit -1	**Finite Difference:** ➢ Concept of finite differences, Finite difference table ➢ Concept of interpolation, Assumption, Uses. **Interpolation for equal intervals: -** ➢ Binomial expansion method (Without proof only application) ➢ Newton's Forward Difference Formula (Without proof only application) ➢ Newton's Backward Difference Formula (Without proof only application)	30%	15
Unit-2	**Interpolation for unequal intervals :** ➢ Newton's Divided Difference Formula (Without proof only application) Lagrange's Interpolation formula (Without proof only application)	10%	5
Unit-3	**Numerical Integration and Differentiation :** ➢ Concept of numerical integration ➢ General Quadrature Formula For Equidistant Ordinates (Without proof) ➢ Trapezoidal rule, Simpson's one- third rule, Simpson's three- eight rule **Concept of numerical differentiation.** ➢ Differentiation based on Newton's forward and Newton's backward formula. (Without proof only application	30%	15
Unit-4	**Iterative Methods for Finding Roots** **Iterative procedures:** ➢ Bisection Method (Without proof only ➢ examples) ➢ Regula Falsi Method (Without proof only examples) ➢ Fixed Point Iteration Method (Without proof only examples) ➢ Secant Method (Without proof only examples) ➢ Newton - Raphson Method (Without proof only examples)	30%	15
	Grand Total	100%	50

Reference Books:		
1.	Shastri, S.S	Introductory methods of Numerical Analysis; Prentice Hall of India
2.	Jain, M.K., Iyengar, S.R.K. and Jain, R.K	Numerical methods for scientific and Engineering Computations; Age International (P.) Ltd.
3.	Froberg, C. E	Introduction to Numerical Analysis, Addition Wesley, Reading Mass.
4.	Gupta and Kapoor	Fundamentals of mathematical statistics
5.	H. Freeman	Finite difference for actual sciences.
6	Stanton R. G	Numerical Methods for Science and Engineering Prentice Hall of India.

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Semester -III

Statistics Paper 1 : Statistics for Business Decision (Major/MDC Paper-I) - Credit 4

Course Outcomes (COs)

On completion of the course, the students will be able to:

CO1	Understand the basic concept of decision theory.
CO2	Understand the basic concept of operations research.
CO3	Understand the concept of Assignment problems.
CO4	Understand the concept of Transportation problems.
CO5	Apply the course content for the further study of statistics.

OBJECTIVE

The main objective of this course is to provide fundamental knowledge of decision theory, assignment problems and transportation problems. The purpose is to make students aware about the application of decision theory and different operations research techniques for real life examples.

Sr.No.	Course inputs (as per UGC model curriculum)	Weightage	Marks
Unit -1	Elementary decision theory: ➢ Meaning and scope of decision theory, basic elements of a statistical decision problem, decision analysis, pay off matrix, decisions under certainty, decisions under uncertainty, Laplace criteria, maximin criteria, Hurwitz criteria, Minimax regret criteria: decision making under risk, expected monetary value (EMV), expected opportunity loss (EOL), expected value of perfect information (EVPI), decision tree.	40%	20
Unit -2	Operations Research – 1: ➢ Definition and scope of O.R. ➢ Linear programming Problem: ➢ Definition of general LPP, formulation of LPP, examples of LPP occurring in various fields graphical solution of LPP (two variables) ➢ Hungarian method for solving an assignment problem, variations in assignment problems	20%	10
Unit -3	Transportation problems: ➢ Balanced and unbalanced TP, methods for initial basic feasible solution (IBFS), matrix minima method, Vogel's approximation method (VAM) and min(max) &max(min) method, optimality test, MODI method for improving an IBFS, optimal solution	20%	10
Unit -4	Assignment problem: ➢ Hungarian method for solving an assignment problem, variations in assignment problems	20%	10
	Grand Total	**100%**	**50**

Reference Books:	
Raiffa H.&Schlaifer R,	Applied statistical decision theory, MIT press, 1968
Goon A.M., Gupta M.K., & Das Gupta B	Fundamentals of statistics , World press, Kolkata, 1991
ElhanceD.N	Fundamentals of statistics , Kitab Mahal, Allahabad, 1986
S D Sharma	Optimization technique,
Swarupkanti, Gupta, P.K. And Manmohan(2007):	Operations Research, 13th Edition, Sultan Chand and Sons.
Taha, H. A. (2007):	Operation Research: An Introduction, 8th Edition, And Prentice Hall of India.
GassS.I	Linear Programming and Application McGraw Hills,1975

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Semester -III

Statistics (SEC- Paper-I): INDUSTRIAL STATISTICS
Credit : 2

Course Outcomes (COs)

On completion of the course, the students will be able to:

CO1	Understand the basic concept of Quality and statistical techniques to improve it.
CO2	Understand the basic concept of control chat.
CO3	Understand the basic concept of TQM.
CO4	Understand application of charts to control quality of the product.
CO5	Apply the knowledge of charts on real life examples..

OBJECTIVE

The main objective of this course is to provide fundamental knowledge of techniques of quality control, cusum chart and total quality management. The purpose is to make students aware about how to control quality of the product using different statistical charts.

Sr.No.	Course Inputs (As per UGC Model Curriculum)	Weightage	Marks
UNIT-I	**The meaning of Quality & Quality improvement** **Introduction of Statistical quality control** **Statistical process control** ➢ Introduction ➢ Measure of location and variability ➢ Process of Control Charts for variables & attributes ➢ Process of control limits ➢ Out of control criteria	**40%**	**10**
UNIT-2	**Statistical product control** ➢ Introduction ➢ Standard plans for attributes ➢ Single sampling plan : O.C. Function, ASN,ATI, AOQ	**40%**	**10**
UNIT-3	**Total Quality Management** ➢ Meaning and Important concepts ➢ Importance of Quality Management ➢ ISO 9001	**20%**	**5**
	GRAND TOTAL	**100%**	**25**

References Books:	
Hopper A.G	**"Basic Statistical Quality Control", McGraw Hill, London.**
Gupta R.C.	"Statistical Quality Control", Khanna publishers, New Delhi.
Ryan T.P.	"Statistical Methods for Quality Improvement"; John Wiley& Sons.
Omachonu V.K. and Ross J.E.	"Principles of Total Quality"; S.Chand& Co., New Delhi.

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Semester -IV

Statistics Paper 4: Mathematical Economics (Major Paper-IV) - Credit 4

Course Outcomes (COs)

On completion of the course, the students will be able to:

CO1	Understand the basic concept of mathematical economics.
CO2	Understand the concept of multiple and partial correlation.
CO3	Understand the concept of multiple regression for three variables.
CO4	Understand about the properties of correlation and regression.
CO5	Apply the course content for the further study of statistics.

OBJECTIVE

The main objective of this course is to provide fundamental knowledge of mathematical economics, multiple and partial correlation and multiple regression. The purpose is to make students aware about utility of the statistical concepts for real life problems.

Sr.No.	Course Inputs (As per UGC Model Curriculum)	Weightage	Marks
Unit -1	Mathematical Economics: ➢ Statistical laws of demand and Supply ➢ Price Equilibrium ➢ Price elasticity of demand & Price elasticity of Supply ➢ Profit maximization under monopoly and Duopoly ➢	**30%**	**15**
Unit-2	➢ Utility Function ➢ Constrained utility maximization ➢ Cob-Dogglas Production function ➢ Examples	**10%**	**5**
Unit-3	Multiple regression (For Three Variables): ➢ Equation of Regression Plane ➢ Properties of residual ➢ Coefficient of multiple regression ➢ derivation of their formula and properties with proof and related results	**30%**	**15**
Unit-4	Multiple and partial correlation: ➢ Concept of partial Correlation ➢ correlation Coefficient for three variables ➢ derivation of their formula and properties with proof and related results (For Three Variable)	**30%**	**15**
	Grand Total	**100%**	**50**

Reference Books:	
Hogg& Craig	Mathematical Statistics
J.K.Goyal, B.K.Saksena	Mathematical economics
Goon A.M., Gupta M.K. and Dasgupta B. (2000):	Fundamentals of Statistics, Vol. I & II, 8th Edn. The World Press, Kolkata.

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Semester -IV
Statistics: Applied Statistics (SEC Paper-II) - Credit 2

Course Outcomes (COs)

On completion of the course, the students will be able to:

CO1	Understand the basic concept of process control.
CO2	Understand the concept of product control.
CO3	Understand the concept of testing of hypothesis.
CO4	Understand the use of hypothesis for large sample.
CO5	Apply the course content for the further study of statistics.

OBJECTIVE

The main objective of this course is to provide fundamental knowledge of process control, product control and testing of hypothesis. The purpose is to make students aware about the application of statistical techniques for research.

Sr. No.	Course Inputs (As per UGC Model Curriculum)	Weightage	Marks
Unit -1	Introduction of Demography: ➢ Meaning ➢ Uses ➢ Method of collecting demographic statistics ➢ Defects of demographic statistics ➢ Life Tables: ➢ Concepts of Life tables & It's Advantages ➢ Assumption related to life tables ➢ Complete and Abridged ➢ Construction of life tables& It's Applications	**40%**	**10**
Unit 2	Testing of Hypothesis (1) Theory of testing of hypothesis ➢ Simple and composite hypothesis ➢ Null and Alternative hypothesis, critical region ➢ Two types of errors ➢ Level of significance and power of a test (2) Large sample test ➢ Large sample test for Attributes ➢ Large sample test for Variables	**60%**	**15**
	Total	**100%**	**25**

Reference Books:

1.	Barkley G.W/(1958)	"Techniques of population analysis " John Wiley & Sons Inc First Ed
2.	Pathak K.B and F. Ram (1998)	"Techniques of Demographic Analysis " 2nd Ed, Himalaya Publishing House
3.	Cox P.R	"Demography " Cambridge University Press
4.	D.C.Sanchaeti and V.K.Kapoor	Statistics (theory , Method and Application) Sultan Chand & Son
5.	D N Elhance	Fundamental of Statistics
6.	Goon.A.M.Gupta, M.k.andDasgupta.B.(2008)	Fundamental of Statistics, Vol. II, 9th Edition World press.

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Semester -IV

Statistics Paper 3: Sampling Theory (Major/MINOR Paper-3) - Credit 4

Course Outcomes (COs)

On completion of the course, the students will be able to:

CO1	Understand the basic concept of sampling.
CO2	Understand the concept of simple random sampling for with and without replacement cases.
CO3	Understand the concept of stratified random sampling.
CO4	Understand the concept of systematic sampling.
CO5	Apply the course content for the further study of statistics.

OBJECTIVE

The main objective of this course is to provide fundamental knowledge of sampling, simple random sampling, stratified sampling and systematic sampling. The purpose is to make students aware about the application of sampling in research.

Sr.No.	Course Inputs (As per UGC Model Curriculum)	Weightage	Marks
Unit -1	**Introduction of Sampling and Simple random sampling with & without Replacement** **Introduction of Sampling:** ➢ Basics principles of sampling theory ➢ Comparison between sample survey and complete enumeration ➢ Errors in sample survey ➢	**10%**	**5**
Unit -2	**Simple random sampling with & without Replacement:** ➢ Selection of sample ➢ Estimation of population total and means ➢ Standard error and coefficient of variation of estimator(Without proof)	**30%**	**15**
Unit-3	**Stratified random Sampling (without Proof):** ➢ Estimation of mean ➢ Variance of the estimator ➢ Estimation of the variance ➢ Estimation f gain due to stratification from a stratified sample ➢ Finding sample sizes under proportional and optimum allocations and their comparisons for a given example.	**40%**	**20**
Unit-4	**Systematic Sampling (Without Proof):** ➢ Estimation of mean ➢ Variance of the estimator ➢ Estimation of the variance based on interpenetrating sub samples ➢ Comparison of systematic and simple random sampling for a given population	**20%**	**10**
	Grand Total	**100%**	**50**

Reference Books:

CochranW.g. (1984):	Sampling Techniques(3rd Ed.) Wiley Eastern
Murthy M.N.(1977)	Sampling theory & Statistical Methods, Statistical Pub. Society, Calcutta.
Sukhatme .P.V.et,al (1997)	"Sampling Theory of surveys with Application " III-Ed , The lowa state Univ Press, Ames, lowa USA and Indian Society of Agriculture Statistics , New Delhi
Yates F. (1960)	Sampling Methods in censuses and surveys Ed-III Charles Griffin &Co.Ltd London
Hansen M.H.et al (1993)	Sample survey Methods and Theory . Willey blackwell : Volume 1 edition