Re-Accredited 'B++' 2.86 CGPA by NAAC
VEER NARMAD SOUTH GUJARAT UNIVERSITY
University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
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સંદર્ભઃ યુનિવર્સિટી કાર્યાલયના તા.૨૭–૦૬–૨૦૨૩, ક્રમાંક : એસ./સાયન્સ/પરિપત્ર/૧૬૦૮૪/૨૦૨૩

–: પરિપત્ર :–

વિજ્ઞાન વિદ્યાશાખા હેઠળની સંલગ્ન તમામ કોલેજોનાં આચાર્યશ્રીઓને જણાવવાનું કે, શૈક્ષણિક વર્ષ ૨૦૨૩–૨૪ થી અમલમાં આવનાર આંકડાશાસ્ત્ર વિષયના F.Y.B.Sc. Sem- 1 & 2 ના મેજર, માઈનર અને મલ્ટિડિસિપ્લિનરીના અભ્યાસક્રમ બાબતે વિજ્ઞાન વિદ્યાશાખાની તા.૦૨/૦૮/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંકઃ૬ અન્વયે સુચવેલ સુધારા મુજબ F.Y.B.Sc. Sem- 1 & 2 ના મેજર, માઈનર અને મલ્ટિડિસિપ્લિનરીના અભ્યાસક્રમ આંકડાશાસ્ત્ર વિષયની અભ્યાસ સમિતિ વતી ચેરમેનશ્રીએ અને વિજ્ઞાન વિદ્યાશાખાની મંજૂરીની અપેક્ષાએ વિદ્યાશાખા વતી વિદ્યાશાખાનાં અધ્યક્ષશ્રીએ મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ એકેડેમિક કાઉન્સિલની તા.૧૭/૦૮/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંકઃ૦૬ થી મંજૂર કરેલ છે. જેનો અમલ કરવા આથી જાણ કરવામાં આવે છે.

એકેડેમિક કાઉન્સિલની તા.૦૭/૦૮/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંકઃ૦૬

:: આથી ઠરાવવામાં આવે છે કે, શૈક્ષણિક વર્ષ ૨૦૨૩–૨૪ થી અમલમાં આવનાર આંકડાશાસ્ત્ર વિષયના F.Y.B.Sc. Sem- 1 & 2 ના મેજર, માઈનર અને મલ્ટિડિસિપ્લિનરીના અભ્યાસક્રમ બાબતે વિજ્ઞાન વિદ્યાશાખાની તા.૦૨/૦૮/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંકઃ૬ અન્વયે સુચવેલ સુધારા મુજબ F.Y.B.Sc. Sem- 1 & 2ના મેજર, માઈનર અને મલ્ટિડિસિપ્લિનરીના અભ્યાસક્રમ આંકડાશાસ્ત્ર વિષયની અભ્યાસ સમિતિ વતી ચેરમેનશ્રીએ અને વિજ્ઞાન વિદ્યાશાખાની મંજૂરીની અપેક્ષાએ વિદ્યાશાખા વતી વિદ્યાશાખાનાં અધ્યક્ષશ્રીએ મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણનો સ્વીકાર કરી મંજૂર કરવામાં આવે છે.

(બિડાણઃ ઉપર મુજબ)

ક્રમાંક : એસ./સાયન્સ/પરિપત્ર/૨૧૪૬૫/૨૦૨૩
તા.૧૮–૦૮–૨૦૨૩

કુલસચિવ વતી

પ્રતિ,
૧) વિજ્ઞાન વિદ્યાશાખા હેઠળની સંલગ્ન તમામ કોલેજોનાં આચાર્યશ્રીઓ.
..... આપશ્રીની કોલેજના સંબંધિત શિક્ષકોને જાણ કરી અમલ કરવા સારૂ.
૨) અધ્યક્ષશ્રી, વિજ્ઞાન વિદ્યાશાખા.
૩) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.

.....તરફ જાણ તેમજ અમલ સારૂ.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR

F. Y. B.SC. SEMESTER – I

TWO MAJORS

STATISTICS

AS PER NEP - 2020

TO BE IMPLEMENTED FROM THE ACADEMIC YEAR 2023-24

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

F.Y.B.Sc.

SEMESTER –I

Statistics (Major-I for Two Majors)

PAPER – ST-MJ-101

Descriptive statistics I (Credit-3)

As per NEP-2020

To be Implemented from the academic year 2023-24

After successfully completing this course, students will be able to:

CO1:distinguish between different types of data and learn level of measurement of data;

CO2:understand the meaning and purpose of data collection;

CO3:know different methods of collection of data;

CO4: distinguish between primary and secondary sources.

CO5:classify the data for further statistical analysis;

CO6:find the difference between quantitative and qualitative classification;

CO7:prepare a frequency distribution table;

CO8:know the technique of forming classes;

CO9:differentiate between univariate and bivariate frequency distributions;

CO10: present data using table.

Diagrammatic and graphic presentation of data:

After successfully completing this course, students will be able to:

	CO1:learn importance of diagrammatic presentation of data; **CO2:**distinguish between diagram and graph; **CO3:**learn how to visualize your data; **CO4:**create bar diagram, pie chart, stem and leaf chart, box plot chart etc; **CO5:**construct and interpret a graph like histogram, frequency polygon and frequency curve for numerical data.	
	Measures of central tendency: After successfully completing this course, students will be able to: **CO1:**statetheneed for summarizing a set of data by a single number; **CO2:**distinguish between different types of averages; **CO3:**learn to compute different averages; **CO4:**draw meaningful conclusions from a set of data.	
	OBJECTIVES ❖ Learn how to visualize data ❖ Learn how to construct different types of charts and graphs and interpretation ❖ Computation of different measures of central tendancy. ❖ Know meaningful conclusions from a set of data.	
Unit-1:	**Collection, Classification and Tabulation of data :**	(40%)
	➢ Concept of Data, Variables and Attributes, ➢ Types of data: ▪ Qualitative and quantitative data, Discrete and continuous data, ▪ Different types of scales: Nominal, Ordinal, Ratio and Interval. ➢ Collection of data: ▪ Primary data and Secondary data, ➢ Classification of data: ▪ Meaning, Advantages and Types of classification,	

	➢ Tabulation of data: ▪ Meaning and Objectives of tabulation, ▪ Guiding rules for tabulation, ▪ Essential parts of a statistical tables, ▪ Types of tables, ▪ Frequency distribution: Discrete and continuous frequency distribution, Cumulative frequency distribution, ▪ Bivariate frequency distribution: Discrete and continuous bivariate frequency distribution. ▪ Numerical Problems.	
Unit-2:	**Diagrammatic and graphic presentation of data :**	(30%)
	➢ **Diagrams:** ▪ Introduction, ▪ Rules for construction of diagrams, ▪ Types of diagrams: Line diagrams, Bar diagrams (simple, multiple, Simple sub-divided and percentage-divided), Stem and leaf chart, Box plot, Circle diagram, Pie diagram and Pictograms. ▪ Importance and limitations of diagrams. ➢ **Graphs:** ▪ Introduction, ▪ Graphs of frequency distributions: Histogram, Frequency polygon, Frequency curve, Cumulative frequency polygon, Cumulative frequency curve. ▪ Importance and limitations of graphs, ▪ Difference between diagram and graph.	

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Unit-3:	**Measures of central tendency :**	(30%)
	➢ Meaning of central tendency, ➢ Measures of central tendency: Mean (Arithmetic Mean, Geometric Mean, Harmonic Mean, Weighted Mean, Combined Mean), Median, Mode. ➢ Merits, demerits and uses of above measures of central tendency, ➢ Characteristic of an ideal measure of central tendency, ➢ Partition values: Quartiles, Deciles, Percentiles. ➢ Percentile rank, ➢ Limitations of measure of central tendency, ➢ Numerical Problems.	
Books:	o S. C. Gupta, V. K. Kapoor: Fundamentals of Mathematical Statistics – 12th Edition, Sultan Chand & Sons o Gupta S.P.: Statistical Methods - 34th Edition, S. Chand & Sons., New Delhi. o Goon A.M., Gupta M. K. and Dasgupta B.: Fundamentals of Statistics, Vol. I & II, 8th Edition. The world press, Kolkata. o Neil Weiss: Introductory Statistics - 10th Edition, Pearson. o Roxy Peck, Chris Olsen, Jay L. Devore: Introduction to Statistics and Data Analysis – 5th Edition, Cengage Learning o Starnes and Tabor: The Practice of Statistics – 6th Edition, W.H. Freeman and Company. o Sancheti & V.K.Kapoor: Mathematical Statistics.	

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

F.Y.B.Sc.

SEMESTER –I

Statistics practical (Major-I for Two Majors)

PAPER – ST-MJ-101

Descriptive statistics- I (Practicals)(Credit-1)

As per NEP-2020

To be Implemented from the academic year 2023-24

- Construction of desecrate frequency distribution.
- Construction of Continuous frequency distribution.
- Construction of Cumulative frequency distribution.
- Finding Median, deciles, percentile and quartiles from graph of cumulative distribution.
- Construction of Bivariate frequency table from the data.
- Create Bar diagram, stem chart, leaf chart, Box Plot chart from the given data.
- Construct Histogram, frequency polygon and frequency curve from the numerical data.
- Calculation of Mean, Median and Mode for the simple series.
- Calculation of Mean, Median and Mode for discrete frequency distribution.
- Calculation of Mean, Median and Mode for Continuous frequency distribution.
- Calculation of quartiles, deciles and percentiles for simple series.
- Calculation of quartiles, deciles and percentiles for discrete frequency distribution.
- Calculation of quartiles, deciles and percentiles for Continuous frequency

	distribution. ➢ Finding missing frequency for continuous distribution. ➢ Calculation of Mean, Median, Mode, quartiles, deciles and percentiles for mixed frequency distribution. ➢ Calculation of Combine Mean, weighted Mean, Harmonic Mean and Geometric Mean. ➢ Relation between arithmetic mean, geometric mean and harmonic mean from a given data.	

	.VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT **F.Y.B.Sc.** **SEMESTER –I** **Statistics (Major-II for Two Majors)** **PAPER – ST-MJ-102** **Descriptive statistics II (Credit-3)** **As per NEP-2020** **To be Implemented from the academic year 2023-24**	
	Measures of dispersion: After successfully completing this course ,students will be able to: **CO1:**know the limitations of average; **CO2:**encourage then use of measures of dispersion; **CO3:**understand various types of measures of dispersion; **CO4:**obtain the measures and then compare them; **CO5:**differentiate between absolute and relative measures.	
	Moments, Skewness and Kurtosis: After successfully completingthis course, students will be able to: **CO1:**know the purpose of moments; **CO2:**obtain various types of moments; **CO3:**understand different characteristics of data. **CO4:** know the complementary relationship of skewness with measures of central tendency And dispersion in describing a set of data;	

	CO5:know whether the distribution is normal or not; **CO6:**tell the direction and extent of a symmetry in a data series; **CO7:**learnthe importance of kurtosis; **CO8:**evaluate and interpret types of kurtosis; **CO9:**distinguish difference between skewness and kurtosis.	
	Probability: After successfully completing this course, students will beable to: **CO1:**be familiar with some basic concepts of probability; **CO2:**distinguish between random and non-random experiments; **CO3:**understand axioms of probability and various theorems on probability; **CO4:** find the probabilities of various events. **CO5:**understandthe concepts of conditional probability and independence of events; **CO6:**know about Bayes'theorem and its applications;	
	OBJECTIVES ❖ Understand various types of measures of dispersion ❖ Understand limitations of average and so that uses of various measures of dispersion , skewness and kurtosis for analysis of data ❖ Use of probability to solve real life problem, social science problem, industrial problem and problem arise in science. ❖ How to use Baye's theorem for solving problems.	
Unit-1:	**Measures of Dispersion :**	(30%)
	➢ Meaning of dispersion, Significance of measuring variation, ➢ Absolute and relative measures of dispersion: Range, Quartile deviation, Mean deviation, Standard deviation, ➢ Merits, demerits and uses of above different measures of dispersion,	

	➢ Characteristic of an ideal measure of dispersion, ➢ Variance, Combined variance, Coefficient of Variation. ➢ Empirical relationships among Quartile deviation, Mean deviation, Standard deviation. ➢ Numerical Problems.	
Unit-2:	**Moments, Skewness and Kurtosis :**	(20%)
	➢ Moments : ▪ Purpose of moments ▪ Moments (for simple and with frequency data) : Raw moments, Central moments, , Moments about arbitrary value and relation of moments ▪ Coefficients based on moments (β_1,β_2,γ_1 and γ_2), ➢ Skewness: ▪ Meaning of skewness, ▪ Symmetric and skew symmetric frequency distribution, ▪ Types and test of skewness, ▪ Methods of determining skewness and the coefficient of skewness (i) Karl Pearson's coefficient of skewness, (ii) Bowley's coefficient of skewness (iii) skewness based on the moments. ➢ **Kurtosis:** ▪ Types of Kurtosis curves, ▪ Measures of Kurtosis. ➢ Numerical Problems.	
Unit-3:	**Probability:**	(30%)
	➢ Concepts in probability,	

	➢ Some important terms: Random experiment, Sample space, Event, Mutually exclusive events, Exhaustive events, Equally likely events, Favourable cases, Independent events. ➢ Classical and statistical definition of probability, ➢ Axiomatic approach to probability, ➢ Theorem based on above topics. ➢ Conditional Probability and its related theorem, ➢ Bayes' theorem and its applications, ➢ Numerical Problems.	
Books :	o S. C. Gupta, V. K. Kapoor: Fundamentals of Mathematical Statistics – 12th Edition, Sultan Chand & Sons o Gupta S.P.: Statistical Methods - 34th Edition, S. Chand & Sons., New Delhi. o Goon A.M., Gupta M. K. and Dasgupta B.: Fundamentals of . Statistics, Vol. I & II, 8th Edition. The world press, Kolkata. o Neil Weiss: Introductory Statistics - 10th Edition, Pearson. o Roxy Peck, Chris Olsen, Jay L. Devore: Introduction to Statistics and Data Analysis – 5th Edition, Cengage Learning o Starnes and Tabor: The Practice of Statistics – 6th Edition, W.H. Freeman and Company.	

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

F.Y.B.Sc.

SEMESTER –I

Statistics Practicals (Major-II for Two Majors)

PAPER – ST-MJ-102

Descriptive statistics II (Practical's)(Credit-1)

As per NEP-2020

To be Implemented from the academic year 2023-24

- Calculation of range, relative measure of range, quartile deviation, coefficient of quartile deviation, average deviation (Mean/Median/Mode), coefficient of average deviation, standard deviation, variance, coefficient of variation (C.O.V),
- Comparison of two series with the use of coefficient of variation.
- Calculation of Raw Moments, Central Moments about Mean and coefficient of skewness and kurtosis for a simple data.
- Calculation of Raw Moments, Central Moments about Mean and coefficient of skewness and kurtosis for a discrete frequency distribution.
- Calculation of Raw Moments, Central Moments about Mean and coefficient of skewness and kurtosis for a Continuous frequency distribution.
- Calculation of Raw Moments, central moments, Measures of skewness and kurtosis about point a.
- Calculation of factorial Moments for a given data (Simple, Discrete, Continuous).
- Calculation of Karl Pearson's Coefficient of skewness.
- Calculation of Bowley's Coefficient of skewness.

	➢ Calculation of Coefficient of skewness and kurtosis with the use of moments and it's interpretation (Discrete and Continuous frequency distribution). ➢ Calculation of probability for a geometric series. ➢ Calculation of probability with the use of Baye's principle.	

	VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT **F.Y.B.Sc.** **SEMESTER –I** **Statistics (Minor)** **PAPER – ST-ME-I** **Descriptive statistics I (Credit-2)** **As per NEP-2020** **To be Implemented from the academic year 2023-24**	
	Measures of central tendency: After successfully completing this course, students will be able to: **CO1:**statetheneed for summarizing a set of data by a single number; **CO2:**distinguish between different types of averages; **CO3:**learn to compute different averages; **CO4:**draw meaningful conclusions from a set of data.	
	Measures of dispersion: After successfully completing this course ,students will be able to: **CO1:**know the limitations of average; **CO2:**encourage then use of measures of dispersion; **CO3:**understand various types of measures of dispersion; **CO4:**obtain the measures and then compare them; **CO5:**differentiate between absolute and relative measures.	

	OBJECTIVES ❖ Computation of different measures of central tendancy. ❖ Focuses on the central distribution of data through a single value. ❖ It provide a convenient summary of the distribution being analyzed. Know meaningful conclusions from a set of data. ❖ Understand various types of measures of dispersion ❖ Student used to describe the variability in a sample or population. ❖ Measures of Dispersion are used to estimate "normal" values of a dataset, measures of dispersion are important for describing the spread of the data, or its variation around a central value. ❖ Understand limitations of average and so that uses of various measures of dispersion , skewness and kurtosis for analysis of data	
Unit-I	**Measures of central tendency :**	50 J.
	➢ Meaning of central tendency, ➢ Measures of central tendency: Mean (Arithmetic Mean, Geometric Mean, Harmonic Mean, Median, Mode. ➢ Merits, demerits and uses of above measures of central tendency, ➢ Characteristic of an ideal measure of central tendency, ➢ Partition values: Quartiles, Deciles, Percentiles. ➢ Limitations of measure of central tendency, ➢ Numerical Problems.	
Unit-II	**Measures of Dispersion :**	50 J.
	➢ Meaning of dispersion, Significance of measuring variation, ➢ Absolute and relative measures of dispersion: Range, Quartile deviation, Mean deviation, Standard deviation, ➢ Merits, demerits and uses of above different measures of dispersion,	

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	➢ Characteristic of an ideal measure of dispersion, ➢ Variance, Combined variance, Coefficient of Variation. ➢ Empirical relationships among Quartile deviation, Mean deviation, Standard deviation. ➢ Numerical Problems.	
Books :	o S. C. Gupta, V. K. Kapoor: Fundamentals of Mathematical Statistics – 12th Edition, Sultan Chand & Sons o Gupta S.P.: Statistical Methods - 34th Edition, S. Chand & Sons., New Delhi. o Goon A.M., Gupta M. K. and Dasgupta B.: Fundamentals of Statistics, Vol. I & II, 8th Edition. The world press, Kolkata. o Neil Weiss: Introductory Statistics - 10th Edition, Pearson. o Roxy Peck, Chris Olsen, Jay L. Devore: Introduction to Statistics and Data Analysis – 5th Edition, Cengage Learning o Starnes and Tabor: The Practice of Statistics – 6th Edition, W.H. Freeman and Company.	

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

F.Y.B.Sc.

SEMESTER –I

Statistics practical (Minor)

PAPER – ST-MN-1

Descriptive statistics- I (Practical's)(Credit-2)

As per NEP-2020

To be Implemented from the academic year 2023-24

- Calculation of Mean, Median and Mode for the simple series.
- Calculation of Mean, Median and Mode for discrete frequency distribution.
- Calculation of Mean, Median and Mode for Continuous frequency distribution.
- Calculation of quartiles, deciles and percentiles for simple series.
- Calculation of quartiles, deciles and percentiles for discrete frequency distribution.
- Calculation of quartiles, deciles and percentiles for Continuous frequency distribution.
- Finding missing frequency for continuous distribution.
- Calculation of Mean, Median, Mode, quartiles, deciles and percentiles for mixed frequency distribution.
- Calculation of Combine Mean, weighted Mean, Harmonic Mean and Geometric Mean.
- Relation between arithmetic mean, geometric mean and harmonic mean from a given data.
- Calculation of range, relative measure of range, quartile deviation, coefficient of quartile deviation, average deviation (Mean/Median/Mode), coefficient of average deviation, standard deviation, variance, coefficient of variation (C.O.V),
- Comparison of two series with the use of coefficient of variation.

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	VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT **F.Y.B.Sc.** **SEMESTER –I** **Elements of Statistics - I (Multidisplinary - I)** **PAPER – ST MD-I** **(Credit-2)** **As per NEP-2020** **To be Implemented from the academic year 2023-24**	
	Measures of central tendency: After successfully completing this course, students will be able to: **CO1:**statetheneed for summarizing a set of data by a single number; **CO2:**distinguish between different types of averages; **CO3:**learn to compute different averages; **CO4:**draw meaningful conclusions from a set of data.	
	Measures of dispersion: After successfully completing this course ,students will be able to: **CO1:**know the limitations of average; **CO2:**encourage then use of measures of dispersion; **CO3:**understand various types of measures of dispersion; **CO4:**obtain the measures and then compare them; **CO5:**differentiate between absolute and relative measures.	

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	OBJECTIVES ❖ Computation of different measures of central tendancy. ❖ Focuses on the central distribution of data through a single value. ❖ It provide a convenient summary of the distribution being analyzed. Know meaningful conclusions from a set of data. ❖ Understand various types of measures of dispersion ❖ Student used to describe the variability in a sample or population. ❖ Measures of Dispersion are used to estimate "normal" values of a dataset, measures of dispersion are important for describing the spread of the data, or its variation around a central value. ❖ Understand limitations of average and so that uses of various measures of dispersion , skewness and kurtosis for analysis of data	
Unit-I	**Measures of central tendency :**	50.1.
	➢ Meaning of central tendency, ➢ Measures of central tendency: Mean (Arithmetic Mean, Geometric Mean, Harmonic Mean, Median, Mode. ➢ Merits, demerits and uses of above measures of central tendency, ➢ Characteristic of an ideal measure of central tendency, ➢ Partition values: Quartiles, Deciles, Percentiles. ➢ Limitations of measure of central tendency, ➢ Numerical Problems.	
Unit-II	**Measures of Dispersion :**	50.1
	➢ Meaning of dispersion, Significance of measuring variation, ➢ Absolute and relative measures of dispersion: Range, Quartile deviation, Mean deviation, Standard deviation, ➢ Merits, demerits and uses of above different measures of	

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	dispersion, ➢ Characteristic of an ideal measure of dispersion, ➢ Variance, Combined variance, Coefficient of Variation. ➢ Empirical relationships among Quartile deviation, Mean deviation, Standard deviation. ➢ Numerical Problems.	
Books :	o S. C. Gupta, V. K. Kapoor: Fundamentals of Mathematical Statistics – 12th Edition, Sultan Chand & Sons o Gupta S.P.: Statistical Methods - 34th Edition, S. Chand & Sons., New Delhi. o Goon A.M., Gupta M. K. and Dasgupta B.: Fundamentals of Statistics, Vol. I & II, 8th Edition. The world press, Kolkata. o Neil Weiss: Introductory Statistics - 10th Edition, Pearson. o Roxy Peck, Chris Olsen, Jay L. Devore: Introduction to Statistics and Data Analysis – 5th Edition, Cengage Learning o Starnes and Tabor: The Practice of Statistics – 6th Edition, W.H. Freeman and Company.	

	VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT **F.Y.B.Sc.** **SEMESTER –I** **Elements of Statistics I (Practical's)** **(Multidisplinary-I) (for Two Majors)** **PAPER – MD-I** **(Credit-2)** **As per NEP-2020** **To be Implemented from the academic year 2023-24**	
	After successfully completing this course, students will be able to: CO1: Compute and interpret different measures of central tendency; CO2: Compute and interpret different measures of dispersion; CO3: make a comparison of two or more than two series with the use of coefficient of variation.	
	➢ Calculation of Mean, Median and Mode for the simple series. ➢ Calculation of Mean, Median and Mode for discrete frequency distribution. ➢ Calculation of Mean, Median and Mode for Continuous frequency distribution. ➢ Calculation of quartiles, deciles and percentiles for simple series. ➢ Calculation of quartiles, deciles and percentiles for discrete frequency distribution. ➢ Calculation of quartiles, deciles and percentiles for Continuous frequency distribution. ➢ Finding missing frequency for continuous distribution. ➢ Calculation of Mean, Median, Mode, quartiles, deciles and percentiles for	

mixed frequency distribution.

- Calculation of Combine Mean, weighted Mean, Harmonic Mean and Geometric Mean.
- Relation between arithmetic mean, geometric mean and harmonic mean from a given data.
- Calculation of range, relative measure of range, quartile deviation, coefficient of quartile deviation, average deviation (Mean/Median/Mode), coefficient of average deviation, standard deviation, variance, coefficient of variation (C.O.V),
- Comparison of two series with the use of coefficient of variation.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

F.Y.B.Sc.

SEMESTER –I

Elements of Statistics II (Multidisplinary)

(for Two Majors)

PAPER – MD-II

(Credit-2)

As per NEP-2020

To be Implemented from the academic year 2023-24

After the completion of the course, the student will be able to:

CO1: Introduction to times series data, application of time series to various fields, Components of a times series, measurement of trend by various methods.

CO2:understand Seasonal Component: Estimation of seasonal component.

CO3: Some Special Processes: Moving-average (MA) process and Autoregressive (AR) process of orders one and two.

CO4: Understand about Index numbers, criteria for a good index number, different types of index numbers, construction of index numbers, consumer price index number, uses and limitations of index numbers

OBJECTIVES

Students can acquainted use of time series analysis in statistics, signal processing, pattern recognition, econometrics, mathematical finance, weather forecasting, earthquake prediction, electroencephalography, control engineering, astronomy, communications engineering, and in applied science and engineering.

Students can acquainted use of index number in statistics is a tool that generally use to measure the difference in relative changes from time to time. The difference can also be from place to place.

Students can acquainted use of index number how it helps the Government to formulate its price policies. They are also used to evaluate the purchasing power of money. Index numbers are also being used for forecasting business and economic

	activities, business cycles.	
Unit-I	**Time Series: Introduction to times series data. Components of a times series.** ➢ Measurement of Trend: o Graphical method. o Method of semi averages. o method of moving averages. o method of curve fitting: ▪ Fitting of straight line by method of least Squares. ▪ fitting second degree parabolic Trend ▪ Fitting Exponential curve. ▪ Growth curve and their fitting ➢ Seasonal Component: • Estimation of seasonal component by Method of simple averages • Ratio to Trend, • Method of moving average	60%
Unit-II	**Index number** • Definition • construction of index numbers • problems thereof for weighted and unweighted index numbers • Laspeyre' s index numbers • , Paasche's, index numbers • Marshal Edgeworth index numbers • Fisher's index numbers • Conversion of fixed based to chain based index numbers and vice-versa. • Consumer price index numbers.	40%
Books :	o S. C. Gupta, V. K. Kapoor: Fundamentals of Mathematical Statistics – 12th Edition, Sultan Chand & Sons o Gupta S.P.: Statistical Methods - 34th Edition, S. Chand & Sons., New Delhi. o Goon A.M., Gupta M. K. and Dasgupta B.: Fundamentals of Statistics, Vol. I & II, 8th Edition. The world press, Kolkata. o Neil Weiss: Introductory Statistics - 10th Edition, Pearson. o Roxy Peck, Chris Olsen, Jay L. Devore: Introduction to Statistics and Data Analysis – 5th Edition, Cengage Learning o Starnes and Tabor: The Practice of Statistics – 6th Edition, W.H. Freeman and Company.	

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

F.Y.B.Sc.

SEMESTER –I

Elements of Statistics II (Practicals)

(Multidisplinary) (for Two Majors)

Practical PAPER – MD-II

(Credit-2)

As per NEP-2020

To be Implemented from the academic year 2023-24

1. Study of trend by graphical method.

2. measurement of trend by method of leas squares(linear, parabolic and exponential)

3. measurement of trend by method of moving averages(odd and even years both)

4. measurement of seasonal variations by moving averages method

5. Measurement of seasonal variations by simple average and ratio to trend method.

6. Examples of forecasting with ARIMA.

7. Computation of Laspeyre's, Pasche's and Fisher's Index numbers.

8. Examples of convert in fixed base index numbers to chain base index numbers.

9. Calculation of cost of living Index.

	VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT **F.Y.B.Sc.** **SEMESTER –I** **Linear Programming Problem (SEC)** **(ST- SEC)** **(Credit-1)** **As per NEP-2020** **To be Implemented from the academic year 2023-24**	
	After the completion of the course, the student will be able to: **CO1:** To learn and gain the knowledge about Linear Programming Problem. CO2: will be capable of formulation of Linear Programming problem from real life situations. **CO3: will** be able to solve Linear Programming Problem by using graphical method	
	OBJECTIVES Students can acquaint with uses of linear programming problem in hospital management, industry, transportation, agriculture and in economics etc. Students can acquaint how to solve problem of linear programming problem when two variables are used by graphical method.	
Unit -1	➢ Definition of general Linear Programming ➢ Problem, Mathematical form of LPP, ➢ Representation of LPP in Matrix form, ➢ Canonical form of LPP ➢ Standard form of LPP. ➢ Real life examples of LPP,	50%

B Naik

Unit-2	➢ Formulation of LPP ➢ Solution of LPP using Graphical Method	50%
	Books Recommended: 1. K. Swarup, Gupta P.K, Man Mohan: Operations Research; S Chand & Co. New Delhi. 2. Sharma S.D. : Operations Research: Kedarnath & Ramnath & Co. Publisher, Meerut. 3. Hira D.S, Gupta P.K : Operations Research; S Chand & Co. New Delhi. 4. Kapoor V.K: Operations Research; Jain book depot. 5. G. Hadley: Linear Programming; Narosa Book distributors pvt Ltd.	

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

F.Y.B.Sc.

SEMESTER –I

Linear Programming Problem (SEC) (Statistics Practical's)

PAPER – I

(Credit-1)

As per NEP-2020

To be Implemented from the academic year 2023-24

1. Representation of LPP in Matrix form.
2. Solution of LPP by using Graphical Method.
3. Formulation and solution of LPP

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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS FOR

F. Y. B.SC. SEMESTER – II

SINGLE MAJOR

STATISTICS

AS PER NEP - 2020

TO BE IMPLEMENTED FROM THE ACADEMIC YEAR 2023-24

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(Chairman)
BOS in Statistics.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

F.Y.B.Sc.

SEMESTER –II

Statistics(Major-I)

PAPER – ST-MJ-201

Univariate & Bivariate Probability functions and Generating functions (Credit-3)

As per NEP-2020

To be Implemented from the academic year 2023-24

Random Variables, Probability functions and Moments:

After successfully completing this course, students will be able to:

CO1:know the basic concept of random variables;

CO2: understand events associated with random variables, probabilities of events and how they are related;

CO3:understand the difference between a discrete and a continuous random variable, recognize when an experiment should be modelled by a discrete or a continuous random variable;

CO4:know about p.m.f.,p.d.f. and c.d.f.;

CO5:obtain probability functions;

CO6: interpret the expectation, variance and standard deviation of a discrete and continuous random variable.

CO7:understand measure of central tendency and measure of dispersion related to random variables;

CO8:obtain different moments of a probability distribution.

	BivariateRandomVariables: After successfully completing this course, students will be able to: **CO1:**distinguishbetweenunivariateandbivariaterandomvariables; **CO2:**understand joint, marginal and conditional p.m.f. and p.d.f .of two random variables; **CO3:**compute of probabilities of events in bivariate probability distribution	
	Generating functions: After successfully completing his course, students will be able to: **CO1:**obtainmomentgeneratingfunctionofaprobability function; **CO2:**obtain factorial moment generating function of a probability function; **CO3:** obtain cumulative generating function etc. of a probability function; **CO4:** obtain cumulative generating function etc. of a probability function;	
	OBJECTIVES ❖ Understand basic concept of random variables ❖ Learn types of random variables and difference between them. ❖ Know about p.m.f., p.d.f. and c.d.f. ❖ Learn various types of measures. ❖ Learn various types of generating functions.	
Unit-1:	**Random Variables, Probability functions and Moments:**	(40%)
	➢ Random variables: Discrete and Continuous, ➢ Probability functions: Probability mass function (p.m.f), Probability density function (p.d.f) and Cumulative distribution function (c.d.f.) with properties, ➢ Mathematical expectation, ➢ Moments (of a random variable): Raw moments, Central moments, Factorial moments. ➢ Relations of above moments ➢ Variance and its properties. ➢ Measure of Central tendency: Mean, Mode, Median, Harmonic mean and Geometric mean. Quartiles.	

	➢ Measure of Dispersion: Range, Quartile deviation, Mean deviation, Standard deviation ➢ Problems of above topics.	
Unit-2:	**Bivariate Random Variables:**	(30%)
	➢ Bivariate Random Variables: ▪ Joint, marginal and conditional p.m.f. and p.d.f. of two random variables, ▪ Indépendence of two random variables, ➢ Properties of mathematical expectation, ➢ Problems of above topics.	
Unit-3:	**Generating functions:**	(30%)
	➢ Moment generating function (m.g.f.) about origin and mean, ➢ Factorial moment generating function, ➢ Cumulant Generating Function (c.g.f.), ➢ Properties and relationship of above functions. ➢ Problems of above topics.	
Books:	o S. C. Gupta, V. K. Kapoor: Fundamentals of Mathematical Statistics – 12th Edition, Sultan Chand & Sons o Gupta S.P.: Statistical Methods - 34th Edition, S. Chand & Sons., New Delhi. o Goon A.M., Gupta M. K. and Dasgupta B.: Fundamentals of Statistics, Vol. I & II, 8th Edition. The world press, Kolkata. o Neil Weiss: Introductory Statistics - 10th Edition, Pearson. o Roxy Peck, Chris Olsen, Jay L. Devore: Introduction to Statistics and Data Analysis – 5th Edition, Cengage Learning o Starnes and Tabor: The Practice of Statistics – 6th Edition, W.H. Freeman and Company.	

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

F.Y.B.Sc.

SEMESTER –II

Statistics Practical (Major-I)

PAPER – ST-MJ-201

Univariate & Bivariate Probability functions and Generating functions Practical (Practical)

(Credit-1)

As per NEP-2020

To be Implemented from the academic year 2023-24

- Calculation of constant and probability for a given p.m.f., c.m.f. and draw it's curve.
- Calculation of mean, variance, median, mode for a given p.m.f.
- Calculation of constant and probability for a given p.d.f.
- Find raw moments, central moments, coefficient of skewness and kurtosis for a given p.m.f.
- Find raw moments, central moments, coefficient of skewness and kurtosis for a given p.d.f.
- Find marginal p.m.f. for a given Bivariate frequency table.
- Find mean, variance, covariance, correlation coefficient, conditional mean for a given Bivariate probability distribution.
- Check the condition of independence of two random variables.
- Calculation of moment generating function, Calculation of moment generating function about mean from a given p.m.f or p.d.f.
- Calculations of various moments from moment generating function and find various measures off skewness and kurtosis from it.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

F.Y.B.Sc.

SEMESTER –II

Statistics (Major-II)

PAPER – ST-MJ-202

Correlation, Regression and Association of Attributes

(Credit-3)

As per NEP-2020

To be Implemented from the academic year 2023-24

Linear Correlation Analysis:

After successfully completing this course, students will be able to:

CO1: comprehend the meaning of the term 'correlation';

CO2: interpret the nature of relationship between two variables;

CO3: compute correlation coefficient and interpret its value;

CO4: critically examine the degree and direction of the relationships between two or more variables;

CO5: understand applications of correlation theory in various fields, viz., agriculture, business, medical science, industry etc.

Linear Regression Analysis:

After successfully completing this course, students will be able to:

CO1: describe the difference between 'correlation' and 'regression';

CO2: understand the purpose of a linear regression equation;

CO3: calculate and interpret linear regression equation;

	CO4: understand and interpret coefficient of determination; **CO5:** understand applications of regression analysis in various fields, viz., agriculture, business, industry etc.	
	Measures of association of attributes (for two attributes): After successfully completing this course, students will be able to: **CO1:** learn about importance of measures of association; **CO2:** understand different types of measures of association; **CO3:** learn the concepts of independence and association of two attributes; **CO4:** calculate measures of association using different methods.	
	OBJECTIVES ❖ Interpret the nature of relationship between two variables. ❖ Understand applications of regression analysis in various fields, viz., agriculture, business, industry etc ❖ Understand different types of measures of association	
Unit-1:	**Linear Correlation Analysis:**	(40%)
	➢ Meaning, Definition and Types of correlation, ➢ Methods of studying correlation: (i) Scatter diagram method (with merits and limitations). (ii) Karl Pearson's product moment method (with merits and limitations), and (iii) Spearman's Rank Correlation method (with derivation, merits and limitations).. ➢ Interpretation correlation coefficient, ➢ Properties, ➢ Problems of above topics.	

Unit-2:	**Linear Regression Analysis:**	(40%)
	➢ Meaning, Definition, ➢ Fitting regression lines by principle of least squares, ➢ Regression coefficients and their properties, ➢ Angle between two lines of regression and its interpretation, ➢ Coefficient Determination, ➢ Utility of study of regression, ➢ Problems of above topics.	
Unit-3:	**Measures of Association of Attributes (for two attributes):**	(20%)
	➢ Idea of notations and terminology for classification of attributes, ➢ Contingency table, ➢ Types of association, ➢ Consistency of data, ➢ Methods of measures of association: (i) Proportion method, (ii) Method of Probability, (iii) Yule's Coefficient of association (with its characteristics), (iv) Coefficient of contingency, ➢ Problems of above topics.	
Books:	o S. C. Gupta, V. K. Kapoor: Fundamentals of Mathematical Statistics – 12th Edition, Sultan Chand & Sons o Gupta S.P.: Statistical Methods - 34th Edition, S. Chand & Sons., New Delhi. o Goon A.M., Gupta M. K. and Dasgupta B.: Fundamentals of Statistics, Vol. I & II, 8th Edition. The world press, Kolkata. o Neil Weiss: Introductory Statistics - 10th Edition, Pearson. o Roxy Peck, Chris Olsen, Jay L. Devore: Introduction to Statistics and Data Analysis – 5th Edition, Cengage Learning o Starnes and Tabor: The Practice of Statistics – 6th Edition, W.H. Freeman and Company.	

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

F.Y.B.Sc.

SEMESTER –II

Statistics Practical (Major-II)

PAPER – ST-MJ-202

Correlation, Regression and Association of Attributes

(Credit-3)

As per NEP-2020

To be Implemented from the academic year 2023-24

- Calculation of karl Pearson's coefficient of correlation and test it's significance.
- Calculation of Spearman's Rank correlation coefficient.
- Calculation of karl Pearson's coefficient of correlation for a Bivariate frequency table.
- Calculation of equations of two regressions lines and estimates the value of variable from a appropriate regression lines.
- Comparison of two attributes from a observed and expected frequency.
- Comparison of two attributes from a proportion method.
- Calculation of coefficient of two attributes using Yule's method.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

F.Y.B.Sc.

SEMESTER –II

Statistics (MINOR) PAPER – ST-ME-II

Correlation and Regression

(Credit-2)

As per NEP-2020

To be Implemented from the academic year 2023-24

Linear Correlation Analysis:

After successfully completing this course, students will be able to:

CO1: comprehend the meaning of the term 'correlation';

CO2: interpret the nature of relationship between two variables;

CO3: compute correlation coefficient and interpret its value;

CO4: critically examine the degree and direction of the relationships between two or more variables;

CO5: understand applications of correlation theory in various fields, viz., agriculture, business, medical science, industry etc.

Linear Regression Analysis:

After successfully completing this course, students will be able to:

CO1: describe the difference between 'correlation' and 'regression';

CO2: understand the purpose of a linear regression equation;

CO3: calculate and interpret linear regression equation;

CO4: understand and interpret coefficient of determination;

	CO5: understand applications of regression analysis in various fields, viz., agriculture, business, industry etc.	
	OBJECTIVES ❖ Interpret the nature of relationship between two variables. ❖ Understand applications of regression analysis in various fields, viz., agriculture, business, industry etc	
Unit-1:	**Linear Correlation Analysis:**	(50%)
	➢ Meaning, Definition and Types of correlation, ➢ Methods of studying correlation: (i) Scatter diagram method (with merits and limitations). (ii) Karl Pearson's product moment method (with merits and limitations), and (iii) Spearman's Rank Correlation method (with derivation, merits and limitations). ➢ Interpretation correlation coefficient, ➢ Properties, ➢ Problems of above topics.	
Unit-2:	**Linear Regression Analysis:**	(50%)
	➢ Meaning, Definition, ➢ Fitting regression lines by principle of least squares, ➢ Regression coefficients and their properties, ➢ Angle between two lines of regression and its interpretation, ➢ Coefficient Determination, ➢ Utility of study of regression, ➢ Problems of above topics.	
Books:	o S. C. Gupta, V. K. Kapoor: Fundamentals of Mathematical Statistics – 12th Edition, Sultan Chand & Sons o Gupta S.P.: Statistical Methods - 34th Edition, S. Chand &	

Sons., New Delhi.
- Goon A.M., Gupta M. K. and Dasgupta B.: Fundamentals of Statistics, Vol. I & II, 8th Edition. The world press, Kolkata.
- Neil Weiss: Introductory Statistics - 10th Edition, Pearson.
- Roxy Peck, Chris Olsen, Jay L. Devore: Introduction to Statistics and Data Analysis – 5th Edition, Cengage Learning
- Starnes and Tabor: The Practice of Statistics – 6th Edition, W.H. Freeman and Company.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

F.Y.B.Sc.

SEMESTER –II

Statistics Practical (MINOR)

Correlation and Regression (Practical)

(Credit-1)

As per NEP-2020

To be Implemented from the academic year 2023-24

- Calculation of karl Pearson's coefficient of correlation and test it's significance.
- Calculation of Spearman's Rank correlation coefficient.
- Calculation of karl Pearson's coefficient of correlation for a Bivariate frequency table.
- Calculation of equations of two regressions lines and estimates the value of variable from a appropriate regression lines.

	VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT **F.Y.B.Sc.** **SEMESTER –II** **(Multidisiplinary-I)** **Statistics in social science (Credit-2)** **As per NEP-2020** **To be Implemented from the academic year 2023-24**	
	Linear Correlation Analysis: After successfully completing this course, students will be able to: **CO1:** comprehend the meaning of the term 'correlation'; **CO2:** interpret the nature of relationship between two variables; **CO3:** compute correlation coefficient and interpret its value; **CO4:** critically examine the degree and direction of the relationships between two or more variables; **CO5:** understand applications of correlation theory in various fields, viz., agriculture, business, medical science, industry etc.	
	OBJECTIVES ❖ Interpret the nature of relationship between two variables. ❖ Understand applications of regression analysis in various fields, viz., agriculture, business, industry etc	
Unit-1:	**Linear Correlation Analysis:**	(40%)
	➢ Meaning, Definition and Types of correlation, ➢ Methods of studying correlation:	

	(i) Scatter diagram method (with merits and limitations). (ii) Karl Pearson's product moment method (with merits and limitations), and (iii) Spearman's Rank Correlation method (with derivation, merits and limitations). ➢ Interpretation correlation coefficient, ➢ Properties, ➢ Problems of above topics.	
Unit-2:	**Linear Regression Analysis:**	(40%)
	➢ Meaning, Definition, ➢ Fitting regression lines by principle of least squares, ➢ Regression coefficients and their properties, ➢ Angle between two lines of regression and its interpretation, ➢ Coefficient Determination, ➢ Utility of study of regression, ➢ Problems of above topics.	
Books:	o S. C. Gupta, V. K. Kapoor: Fundamentals of Mathematical Statistics – 12th Edition, Sultan Chand & Sons o Gupta S.P.: Statistical Methods - 34th Edition, S. Chand & Sons., New Delhi. o Goon A.M., Gupta M. K. and Dasgupta B.: Fundamentals of Statistics, Vol. I & II, 8th Edition. The world press, Kolkata. o Neil Weiss: Introductory Statistics - 10th Edition, Pearson. o Roxy Peck, Chris Olsen, Jay L. Devore: Introduction to Statistics and Data Analysis – 5th Edition, Cengage Learning o Starnes and Tabor: The Practice of Statistics – 6th Edition, W.H. Freeman and Company.	

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

F.Y.B.Sc.

SEMESTER –II

(Multidisiplinary-I) (Practical)

Statistics in social science (Practical)

(Credit-2)

As per NEP-2020

To be Implemented from the academic year 2023-24

- Calculation of karl Pearson's coefficient of correlation and test it's significance.
- Calculation of Spearman's Rank correlation coefficient.
- Calculation of karl Pearson's coefficient of correlation for a Bivariate frequency table.
- Calculation of equations of two regressions lines and estimates the value of variable from a appropriate regression lines.

	VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT **F.Y.B.Sc.** **SEMESTER –II** **(Multidisiplinary-II)** **Sampling Techniques (Credit-2)** **As per NEP-2020** **To be Implemented from the academic year 2023-24**	
	After the completion of the course, the student will be able to: **CO1.**:Understand the principal steps in sample survey, basic principle of sample survey, errors in sampling, complete enumeration versus sampling, simple random sampling with and without replacement, procedure of selecting a sample and determination of sample size. **CO2:** Know the concept of stratified random sampling, proportional and optimum allocations and their comparisons with SRS, practical difficulties in allocation. CO3: will know concept of systematic sampling and estimation of population mean.	
	Objectives Simple random sampling to make generalizations about a population. Major advantages include its simplicity and lack of bias. When population is homogeneous this method is widely applicable. Stratified random sampling is typically used by researchers when trying to evaluate data from different subgroups or strata. It allows them to quickly obtain a sample population that best represents the entire population being studied. **Systematic** sampling is a statistical method **used** to select a **sample** from a larger population systematically and randomly.	
Unit-I	Terminology of Simple Random Sampling: • Define terms: Population, Sample, Complete enumeration, sampling, sampling unit, sampling frame, sampling method, Parameter, Statistic, Estimate, Estimator. • Advantages of sampling, Difference between population study and sample study, limitations of sampling, Principles of sampling method, Sampling and non sampling errors, Characteristics of an ideal sample. • Simple Random Sampling(SRS): Simple Random Sampling With Replacement(SRSWR) and Simple Random Sampling Without Replacement(SRSWOR) , methods of selection of sample,Estimation of	50%

	population mean and population total. • SRS of attributes(proportions): Estimation of population proportion and total units, advantages and limitations. Examples of above topics.	
Unit-II	Stratified Random Sampling: • Concept of stratified random sampling. • Method of selection of sample. • Estimation of population mean. • Advantages and limitations. Examples .	30%
Unit-III	Systematic random sampling: • Concept of systematic random sampling. • Method of selection of sample. • Estimation of population mean. • Advantages and limitations. Comparison of simple random sampling, Stratified random sampling and systematic for given population. Examples.	20%
	Books recommended: 1. Cochran W.G.: Sampling Techniques. 2. Murthy. M. N. : Sampling theory and methods. 3. Des Raj : Sampling theory. 4. Deming W.E.: Some Theory of Sampling.	

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

F.Y.B.Sc.

SEMESTER –II

(Multidisiplinary-II)(Practical)

Sampling Techniques (Credit-2)

As per NEP-2020

To be Implemented from the academic year 2023-24

1.To select a SRS with and without replacement.

2. For a population of size 5, estimate population mean, population mean square and population variance. Enumerate all possible samples of size 2 by WR and establish all properties relative to SRS.

3. For a population of size 5, estimate population mean, population mean square and population variance. Enumerate all possible samples of size 2 by WOR and establish all properties relative to SRS

4. For SRSWOR, estimate mean, standard error, the sample size.

5. Estimation of Population mean and Population total (SRS)

6. Stratified Sampling: allocation of sample to strata by proportional and Neyman's methods Compare the efficiencies of above two methods relative to SRS.

7.Estimate of population mean from stratified sample.

8. Estimate of mean and variance of stratified sample.

9.To select stratified sample.

10 Estimate of population mean from stratified sample.

	VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT **F.Y.B.Sc.** **SEMESTER –II** **SEC (Statistics)** **Demographic Methods (Credit-1)** **As per NEP-2020** **To be Implemented from the academic year 2023-24**	
	CO1: Solve a wide variety of mathematical problems related to the actuarial science field **CO2:** Demonstrate proficiency in the fundamental concepts of financial mathematics including the theory of interests and financial derivatives.	
	OBJECTIVES Students acquaint the knowledge of different types of mortality rates. Students acquaint use of different types of rates in life insurance and general insurance.	
Unit-I	Demographic Methods: ➢ Introduction, ➢ measurement of population, rates and ratios of vital events. ➢ Measurement of mortality: ➢ CDR, SDR (w.r.t. Age and sex), ➢ IMR, ➢ Standardized death rates.	50%
Unit-II	➢ Life (mortality) tables: ➢ definition of its main functions and uses. ➢ Measurement of fertility and reproduction: ➢ CBR, GFR, and TFR. Measurement of population growth: GRR, NRR	50%

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Books Recommended:

1.Mukhopadhyay P. (1999): Applied Statistics, Books and Allied (P) Ltd.

2. Gun, A.M., Gupta, M.K. and Dasgupta, B. (2008): Fundamentals of Statistics, Vol. II, 9thEdition, World Press.

3. Biswas, S. (1988): Stochastic Processes in Demography & Application, Wiley EasternLtd.

4. Croxton, Fredrick E., Cowden, Dudley J. and Klein, S. (1973): Applied GeneralStatistics, 3rd Edition. Prentice Hall of India Pvt. Ltd.

5. Keyfitz N., Beckman John A.: Demogrphy through Problems S-Verlag New york.

	VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT **F.Y.B.Sc.** **SEMESTER –II** **Statistics (SEC) (Practical)** **Mathematical Statistics (Practical)** **(Credit-1)** **As per NEP-2020** **To be Implemented from the academic year 2023-24**	
	1.To calculate CDR and Age Specific death rate for a given set of data 2. To find Standardized death rate by:- (i) Direct method (ii) Indirect method 3. To calculate CBR, GFR, SFR, TFR for a given set of data 4. 7. Calculate GRR and NRR for a given set of data and compare them	