RANI CHANNAMMA UNIVERSITY, BELAGAVI

PROGRAM /COURSE STRUCTURE AND SYLLABUS
as per the Choice Based Credit System (CBCS)
designed in accordance with
Learning Outcomes-Based Curriculum
Framework (LOCF) of National Education Policy
(NEP) 2020
for

B.A. Statistics

Academic Year 2021-22 and onwards

RANI CHANNAMMA UNIVERSITY, BELAGAVI

BOS COMMITTEE (NEP- GEOGRAPHY)
B.A./B.Sc. STATISTICS PROGRAM 2021-22

1	**Prof. V. S. Shigehalli** **Department of Mathematics, RCU Belagavi**	Chairman
2	**Prof. S. M. Hancihnal** Anjuman Arts, Science and Commerce College Vijaypur	Member
3	**Prof. P. S. Chanagond** S S Mamadapur Science College Badami	Member
4	**Prof. S. M. Hiremath** KRCES GGD and BMP Commerce and SVS Science College Baihongal	Member
5	**Dr. Prakash R Kengnal** STC Arts and Commerce College, Banhatti	Member
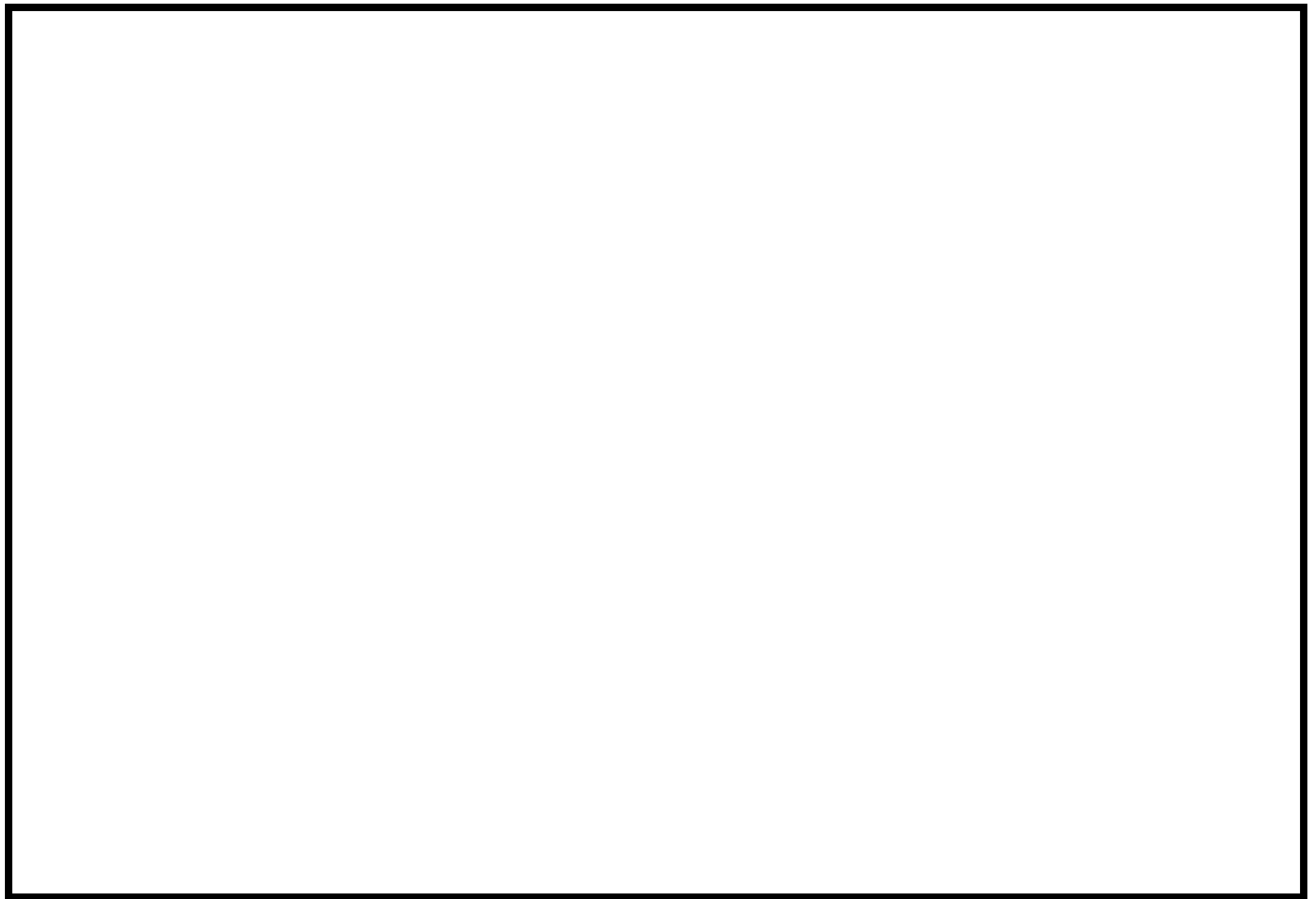
Preamble

Several reforms in our education system has been proposed and developed by Ministry of HRD as National Education Policy (NEP)2020 which includes broad based multidisciplinary undergraduate education with necessary knowledge, skills and competencies. It also proposes to bring equity, efficiency and academic excellence at different levels of education. NEP also recommended multidisciplinary undergraduate programmes with multiple exit and multiple entry options with the provision of Certificate/Diploma/Degrees at each of the exits.

Probability and Statistics is the language of uncertainties, riddled modern information age. Statistics facilitates the decision making process by quantifying the element of chance or uncertainties. Its descriptive and inferential procedures not only formulate the basis of the growth of almost all disciplines of the contemporary world, and also provide an array of employment avenues in all fields. This is a rigorous program in Probability Theory , Statistical Inference, Multivariate Analysis, Linear Models and Regression Analysis and Sample surveys and Design of Experiments designed to give a sound foundation in fundamentals and training in practical Statistics leading to statistical data analysis. The six semester 166 credit program has a variety of elective courses to choose from including enough courses on statistical software. A person successfully completing the program will have enough knowledge and expertise to statistically analyze small and large univariate and multivariate data sets, work in software/data analytics industry as domain expert, independently consult for statistical data analysis. The program has proved to be one of the best in traditional Indian Universities/Institutes and has demand from students within and outside the State/Country.

Syllabus & Regulations Governing the Choice-Based Credit System (CBCS) for the Three-Years (Six Semesters) Bachelor of Arts (B.A

With Applied Statistics as Minor without practicals & other course as Major without practicals Program Structure

MODEL CURRICULUM

Degree Program: B.A. Degree

Discipline Core: Statistics   **Total Credits for the Program:** 136 (till 6th Semester)

Program Outcomes

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

1. Acquire fundamental/systematic or coherent understanding of the academic field ofStatistics and its different learning areas and applications.

2. Develop and demonstrate an ability to understand major concepts in variousdisciplines of Statistics.

3. Demonstrate the ability to use skills in Statistics and different practicing areas for formulating and tackling Statistics related problems and identifying and applyingappropriate principles and methodologies to solve a wide range of problems associatedwith Statistics.

4. Understand procedural knowledge that creates different types of professionals related to subject area of Statistics, including professionals engaged in government/public serviceand 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 findingsof 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, probabilitystatements.

8. Analyze, interpret the data and hence help policy makers to take a proper decision.

9. Recognize the importance of statistical modelling and computing, and the role of approximation and mathematical approaches to analyze the real problems using variousstatistical 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; ICT skills;

    (v)   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 national sample survey, research projects using sample survey, sampling techniques.

12. Understand and apply principles of least squares to fit a model to the given data, study the association between the variables, applications of Probability Theory and Probability Distributions.

RANI CHANNAMMA UNIVERSITY
VIdyaSangam, NH-4, Belagavi. -591156

Proposed Curricular and Credits Structure under Choice Based Credit System [CBCS] of Statistics Discipline Scheme for the four Years Statistics B.A. Undergraduate Honors Programme with effect from 2021-22

B.A. SEMESTER-I

Category	Course code	Title of the Paper	Marks			Teaching hours/week			Credit	Duration of exams (Hrs)
			IA	SEE	Total	L	T	P		
L1	21BAL1LK1	Kannada	40	60	100	4	-	-	3	2
	21BAL1LFK1	Functional Kannada								
L2	21BA1L2LEN2	English	40	60	100	4	-	-	3	2
	21BAL2LHI2	Hindi								
	21BA1L2LSN2	Sanskrit								
	21BA1L2LTE2	Telugu								
	21BA1L2LUR2	Urdu								
DSC1	21BA1STSDSCT1	Descriptive Statistics – I	40	60	100	3	-	-	3	2
	21BA1STSDSCP1	Descriptive Statistics – I	30	70	100	3	-	-	3	2
DSC1	Another Department Code	Another Department Course Title	40	60	100	3	-	-	4	2
			40	60	100	3	-	4	2	2
SEC1	21BA1SE1CS1	Digital Fluency	25	25	50	1	-	2	2	2
VBC1	21BA1V1PE1	Physical Education- Yoga	25	-	25	-	-	2	1	-
VBC2	21BA1V2HW1	Health & Wellness	25	-	25	-	-	2	1	-
OEC	21BA1STSOECT1	Statistics in Competitive Examinations	40	60	100	3	-	-	3	2
		Total Marks	800			Semester Credits			25	

B.A. SEMESTER-II

Category	Course code	Title of the Paper	Marks			Teaching hours/week			Credit	Duration of exams (Hrs)
			IA	SEE	Total	L	T	P		
L3	21BA2L3LK2	Kannada	40	60	100	4	-	-	3	2
	21BA2L3FKL2	Functional Kannada								
L4	21BA2L4EN2	English	40	60	100	4	-	-	3	2
	21BA2L4HI2	Hindi								
	21BA2L4SN2	Sanskrit								
	21BA2L4TE2	Telugu								
	21BA2L4UR2	Urdu								
DSC2	21BA1STSDSCT2	Probability and Distributions	40	60	100	3	-	-	3	2
	21BA1STSDSCP2	Statistics for Economics	40	60	100	3	-	-	3	2
DSC2	Another Department Code	Another Department Course Title	40	60	100	3	-	-	4	2
			40	60	100	3	-	4	2	2
AECC1	21BA2AE1ES2	Environmental Studies	25	25	50	1	-	2	2	2
VBC3	21BA2V3PE2	Physical Education- Sports	25	-	25	-	-	2	1	-
VBC4	21BA2V4NC1	NCC/NSS/R&R(S&G) / Cultural	25	-	25	-	-	2	1	-
OEC2	21BA1STSDSCT1	Statistical Methods	40	60	100	3	-	-	3	2
		Total Marks		800		Semester Credits			25	

B.A. SEMESTER-III

Category	Course code	Title of the Paper	Marks			Teaching hours/week			Credit	Duration of exams (Hrs)
			IA	SEE	Total	L	T	P		
L5	21BA3L5LK3	Kannada	40	60	100	4	-	-	3	2
	21BA3L5LFK3	Functional Kannada								
L6	21BA3L6EN3	English	40	60	100	4	-	-	3	2
	21BA3L6HI3	Hindi								
	21BA3L6SN3	Sanskrit								
	21BA3L6TE3	Telugu								
	21BA3L6UR3	Urdu								
DSC3	21BA1STSDSCT3	Exact Sampling Distributions and Statistical Inference	40	60	100	3	-	-	3	2
	21BA1STSDSCP3	Sampling Techniques	40	60	100	3	-	-	3	2
DSC3	Another Department Code	Another Department Course Title	40	60	100	3	-	-	4	2
			40	60	100	3	-	4	2	2
SEC2	21BA3SE2ES2	Artificial Intelligence	25	25	50	1	-	2	2	2
VBC5	21BA3V5PE3	Physical Education- Sports	25	-	25	-	-	2	1	-
VBC6	21BA3V6NC2	NCC/NSS/R&R(S&G) / Cultural	25	-	25	-	-	2	1	-
OEC3	21BA1STSDSCT3	Business Statistics	40	60	100	3	-	-	3	2
		Total Marks	800			Semester Credits			25	

B.A. SEMESTER-IV

Category	Course code	Title of the Paper	Marks			Teaching hours/week			Credit	Duration of exams (Hrs)
			IA	SEE	Total	L	T	P		
L7	21BA4L7LK4	Kannada	40	60	100	4	-	-	3	2
	21BA4L7LFK4	Functional Kannada								
L8	21BA4L8EN4	English	40	60	100	4	-	-	3	2
	21BA4L8HI4	Hindi								
	21BA4L8SN4	Sanskrit								
	21BA4L8TE4	Telugu								
	21BA4L8UR4	Urdu								
DSC4	21BA1STSDSCT4	ANOVA and Design of Experiments	40	60	100	3	-	-	3	2
	21BA1STSDSCP4	Regression Analysis and Econometrics	40	60	100	3	-	-	3	2
DSC4	Another Department Code	Another Department Course Title	40	60	100	4	-	-	4	2
			40	60	100	-	-	4	2	2
AECC2	21BA4AE1ES2	Constitution of India	25	25	50	1	-	2	2	2
VBC7	21BA4V5PE4	Physical Education- Sports	25	-	25	-	-	2	1	-
VBC8	21BA4V6NC3	NCC/NSS/R&R(S&G) / Cultural	25	-	25	-	-	2	1	-
OEC4	21BA1STSDSCT4	Quantitative Aptitude	40	60	100	3	-	-	3	2
		Total Marks		800		Semester Credits		25		

B.A. SEMESTER-V

Category	Course code	Title of the Paper	Marks			Teaching hours/week			Credit	Duration of exams (Hrs)
			IA	SEE	Total	L	T	P		
STATISTICS AS A MINOR										
DSC5	21BA1STSDSCP5	Statistical Quality Control	40	60	100	4	-	-	3	2
DSC5	Another Department Code as a Major Subject	Another Department Course Title	40	60	100	4	-	-	3	2
			40	60	100	4	-	4	2	2
DSE1	Another Department	Another Department Course Title	40	60	100	3	-	4	2	2
VC1 (Any one)	21BA5VCGEG5.1A	Basics of Map Making	40	60	100	3	-	-	3	2
	21BA5VCGEG5.1B	Mobile Asset Mapping								
VBC9	21BA5V5PE5	Physical Education-Sports	25	-	25	-	-	2	1	-
VBC10	21BA5V6NC4	NCC/NSS/R&R(S&G) / Cultural	25	-	25	-	-	2	1	-
SEC3	21BA5SE3CS3	Cyber Security	25	25	50	1	-	2	2	2
			Total Marks		600	Semester Credits			22	

B.A. SEMESTER-VI

Category	Course code	Title of the Paper	IA	SEE	Total	L	T	P	Credit	Duration of exams (Hrs)
			Marks			Teaching hours/week				
STATISTICS AS MINOR										
DSC6	21BA1STSDSCP6	Operations Research	40	60	100	4	-	-	3	2
DSC6	Another Department Code as a Major Subject	Another Department Course Title	40	60	100	4	-	-	3	2
			40	60	100	4	-	4	2	2
DSE2	Another Department Code	Another Department Course Title	40	60	100	3	-	4	2	2
VC2 (Any one)	21BA6VCGEG6.1A	Open Source GIS	40	60	100	3	-	-	3	2
	21BA6VCGEG6.1B	Landscape and Layout Mapping								
INT1	21BA6 INT1L	Internship	25	50	75	-	-	2	2	2
VBC1	21BA6V5PE5	Physical Education- Sports	25	-	25	-	-	2	1	-
VBC2	21BA6V6NC4	NCC/NSS/R&R(S&G) / Cultural	25	-	25	-	-	2	1	-
SEC4	21BA6SE4CS4	Professional Communication	25	25	50	1	-	2	2	2
		Total Marks	675			Semester Credits		24		
		Total Marks for BA Program	4475			Total Credits for BA Program		136		

BA

Semester 1

Course Title: B.A	
Total Contact Hours: 42	Course Credits:3
Formative Assessment Marks: 40	Duration of ESA/Exam: 2hours
	Summative Assessment Marks: 60

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-12)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12
1. Organize, manage and present data.	X	X		X								
2. Analyze statistical data graphically using frequency distributions and cumulative frequency distributions.	X						X					
3. Analyze statistical data using measures of central tendency, dispersion.				X				X		X		
4. Understand Skewness and Kurtosis and their use in studying various characteristics of data.			X									
5. Know concept of correlation, various correlation coefficients- Pearson's correlation coefficient, Spearman's rank correlation coefficient.			X									
6. Carryout spatial analysis.							X					
7. Understand the Price and Quantity Index numbers and their different measures, understand the applicability of cost of living Index number.									X	X		
8. Know the components and Need for Time series, understand the different methods of studying trend and Seasonal Index.	X								X	X		
9. Solve problems of economics concerns using demand analysis, supply functions, Gini's coefficient and Lorenz Curve.									X	X		
10. Understand basic concepts, important theorems on probability and their use in solving problem.											X	

11.Know random variable, mathematical expectation, and numerical problems on mathematical expectation.	X										X	
12. Understand the most common discrete and continuous probability distributions										X		

and their real life applications.															
13. Understand the nature of data and to perform appropriate analysis.														X	X
14. Carry out time series analysis and predict the future values of given trend.														X	X
15. Analyze the Seasonal Indies by using different methods.	X														X	X

Course Articulation Matrix relates course outcomes of course with the corresponding program outcomes whose attainment is attempted in this course. Mark 'X' in the intersection cell if a course outcome addresses a particular program outcome.

BA Semester 1

Title of the Course: Applied statistics

Course 1: Descriptive Statistics-I		Course 2:Descriptive Statistics-II	
Number of Theory Credits	**Number of lecture hours/semester**	**Number of Theory Credits**	**Number of lecture hours/semester**
3	42	3	42

Content of Course 1: Descriptive Statistics-I	**42 Hrs**
Unit – 1 :Introduction to Statistics and Basic Concepts	**12 Hrs**
Meaning, origin, definition, functions, limitations and applications of Statistics. Primary and secondary data, different methods of collection of primary data with merits and demerits. Sources of secondary data. Classification: meaning, objectives, types of classifications-Chronological, Geographical, Qualitative and Quantitative classifications with illustrations. Definition of some important terms - class, class limits, class intervals, width of class interval, open-end classes, inclusive and exclusive classes. Formation of discrete and continuous frequency distributions. Tabulation: meaning, objectives and rules of tabulation, format of a statistical table and its parts. Types of table, examples of preparation of a blank table and tables with numerical information.	
Unit – 2 :Diagrammatic and Graphical representation of Data	**10 Hrs**
Diagrams: Meaning, importance of diagrams and general rules of construction of diagrams. Types of Diagrams – simple, multiple, component, percentage bar diagrams and pie diagrams with simple illustrations. Graphs: Types of Graphs – Histogram, frequency Polygon, frequency curve and Ogives, simple problems, location of mode, median and partition values from the graphs. Difference between diagrams and graphs.	

Unit – 3:Measures of Central Tendency	10 Hrs
Meaning of central tendency and essentials of a good measure of central tendency. Types of measures of central tendency: Arithmetic mean, Median, Mode, Geometric mean and Harmonic mean - definition, merits and demerits. Properties of arithmetic mean. Empirical relation between mean median and mode. Problems on both grouped and ungrouped data for all the measures. Partition values-definition and types of partition values: quartiles, deciles and percentiles. Problems on Quartiles for grouped ungrouped data only.	
Unit – 4:Measures of Dispersion	**10 Hrs**
Meaning and objectives of measures of dispersion. Essentials of a good measure of dispersion, absolute and relative measures of dispersion. Types of measures of dispersion- Range, Quartile deviation, Mean deviation and standard deviation with relative measures – definition, merits and demerits. Properties of Standard deviation, simple problems on ungrouped and grouped data. **Skewness and Kurtosis:** Skewness- Definition, objectives and types of skewness, explanation of positive and negative skewness with diagrams. Measures of skewness- Karl Pearson's coefficient of skewness and Bowley's coefficient of skewness. Simple problems. Kurtosis: Definition and types of kurtosis. Explanation of types of kurtosis with neat diagrams. Measure of skewness based on moments. Difference between skewness and kurtosis.	

References

1. Gani S. G., Sankhyshastra and Ganakayantra. Udaya Ravi Publications, Bijapur.

2. Gupta S. C. Fundamentals of Statistics, Himalaya Publishing House, Bombay

3. Mukhopadhaya, P. Applied Statistics, New Central Book Agency (P) Ltd., Calcutta

4. Gupta S P. and V K Kapoor Fundamentals of Mathematical Statistics, Sultan Chand, New Delhi

Pedagogy

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

2. Students are encouraged to use resources available on open sources.

Content of Course 2:Descriptive Statistics-II	42 Hrs
Unit – 1 :Correlation	**12 Hrs**
Definition of relationship, Definition, Types of correlation, Methods of measuring correlation, Scatter diagram, Correlation Coefficient for quantitative data: Prof. Karl Pearson's coefficient of linear correlation, its properties, Correlation Coefficient for qualitative data: Spearman's rank correlation coefficient, its properties. Simple regression analysis- regression equations by method of least squares, linear regression coefficients and its properties. Angle between the regression lines.	
Unit – 2: Association of Attributes	**10 Hrs**
Meaning of association of attributes, definition of class of the first order and second order. Methods of studying association. Yule's coefficient of association and its interpretation. Determination of Yule's coefficient of association in case of two attributes.	
Unit – 3: Spatial Statistics	**10 Hrs**
History and introduction, spatial characterization, spatial dependence, spatial auto correlation, spatial association, spatial scaling, spatial sampling, errors in spatial analysis.	
Unit:4: Multivariate data Analysis	**10 Hrs**
Introduction: Yule's notations, distribution of two variables, distribution of three or more variables, primary and secondary subscripts, Plane of regression and its derivation, estimation of regression coefficients a and b in case of three variables, partial regression coefficient in terms of delta, Residual, properties of residuals, Standard deviation of residuals, Multiple and partial correlation, definition, derivation and their standard properties.	

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. and Purves, R. (2014), Statistics, 4th Edition, W. W. Norton & Company.
4. Gani S. G., Sankhyshastra and Ganakayantra. Udaya Ravi Publications, Bijapur.
5. Gupta S. C. Fundamentals of Statistics, Himalaya Publishing House, Bombay
6. Gupta S P. and V K Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand, New Delhi

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BA Semester 2 Title of the

Course: Applied Statistics

Course 3: Statistics for Economics		Course 4:Probability and Distributions	
Number of Theory Credits	Number of lecture hours/semester	Number of Theory Credits	Number of lecture hours/semester
3	42	3	42

Content of Course 3: Statistics for Economics	42 Hrs
Unit – 1 :Supply and Demand	**10 Hrs**
How Markets Work, Markets and Welfare Markets and competition; determinants of individual demand/supply; demand/supply schedule and demand/supply curve; market versus individual demand/supply; shifts in the demand/supply curve, demand and supply together; how prices allocate resources; elasticity and its application; controls on prices; taxes and the costs of taxation; consumer surplus; producer surplus and the efficiency of the markets.	
Unit – 2:Measuring income inequality: Lorenz curve & Gini Coefficient	**10 Hrs**
Measuring income inequality: Pareto law of Distribution, Lorenz curve and Gini's Coefficient, Limitations and interpretations of GC.	
Unit – 3:Index numbers	**12 Hrs**

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, factor reversal test, and Circular 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.	
Unit 4:Time Series Analysis	**10 Hrs**
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, ratio of trend method, link relatives method, Cyclical variation- definition, distinction from seasonal variation, Irregular variation- definition, illustrations.	

References

1. Gupta S. C. Fundamentals of Statistics, Himalaya Publishing House, Bombay

2. Mukhopadhaya, P. Applied Statistics, New Central Book Agency (P) Ltd., Calcutta

3. Gupta S P. and V K Kapoor Fundamentals of Mathematical Statistics, Sultan Chand, New Delhi.

Pedagogy

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2. Students are encouraged to use resources available on open sources.

Content of Course 4: Probability and Distributions	42 Hrs
Unit – 1 :Introduction to Probability	**10 Hrs**
Introduction to probability, Basic concepts: Random experiment, Sample space, Mutually exclusive, exhaustive, equally likely events, complimentary events, classical, statistical and axiomatic definition of probability, properties, Addition theorem of Probability and Definition of independent, dependent events, Conditional probability, Multiplication theorem of Probability without proof. Simple numerical problems.	
Unit – 2:Random Variable and Mathematical Expectation	**10 Hrs**
Definition of a random variable, discrete & continuous random variable, probability mass function, probability density function, distribution function. Definition of mathematical expectation, expected mean and variance of discrete random variable. Properties of Mathematical expectation. Statement of addition and multiplication theorem of expectation. Numerical problems on mathematical expectation.	
Unit – 3:Discrete Distributions	**12 Hrs**
Binomial Distribution: Definition of Binomial Distribution, mean and Variance of Binomial distribution, numerical problems on binomial distribution. Uses of binomial distribution. Fitting of Binomial distribution and obtaining expected probabilities. Simple problems. **Poisson Distribution:** Definition of Poisson distribution. Mean, Variance and its properties of Poisson variate. Uses of Poisson distribution. Simple problems on Poisson distribution. Computing probabilities for large n and small p for the given λ, finding λ for given two successive probabilities. Conditions for Poisson distribution as limiting form of Binomial distribution. Fitting of Poisson distribution.	
Unit – 4 : Normal Distribution	**10 Hrs**
Definition of normal variate. Application of Normal distribution Definition of standard normal variate, standard normal distribution and properties of normal curve. Conditions under which binomial distribution tend to normal distribution (Statement only). Finding probabilities and expected numbers when mean and variance are given quartile deviation, mean deviation and standard deviation and problems.	

References

1. Gupta S. C. Fundamentals of Statistics, Himalaya Publishing House, Bombay

2. Mukhopadhaya, P. Applied Statistics, New Central Book Agency (P) Ltd., Calcutta

3. Gupta S P. and V K Kapoor Fundamentals of Mathematical Statistics, Sultan Chand, New Delhi.

4. Gani S. G., Sankhyshastra and Ganakayantra. Udaya Ravi Publications, Bijapur.

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Formative Assessment: 40 marks	
Assessment Occasion/ type	**Weightage in marks**
1st Internal Assessment Test for 30 marks 1 hr after 8 weeks and 2nd Internal Assessment Test for 30 marks 1 hr after 15 weeks . Average of two tests should be considered.	30
Assignment/Seminar (7 marks)+Attendance(3marks)	10
Total	40

RANI CHANNAMMA UNIVERSITY
Department of Statistics
I Semester B.A Statistics

Sub: Code: Maximum Marks: 60

a.   Answer any Six Questions from Question 1   b. Answer any Three each Questions from Question 2,3,4and 5

Q.No.1.	Answer any Six Questions (At least Two question from Each Unit) a. b. c. d, e. f. g. h.	2X6=12
Q.No.2.	(Should cover Entire Unit-I)a. b. c. d.	4X3=12
Q.No.3.	(Should cover Entire Unit-II)a. b. c. d.	4X3=12
Q.No.4.	(Should cover Entire Unit-III)a.	4X3=12
	b. c. d.	
Q.No.5.	(Should cover Entire Unit-IV)a. b. c. d.	4X3=12

List of Open Electives

1. Statistics in Competitive Examinations

2. Statistical Methods

3. Business Statistics

4. Quantitative Aptitude

1. *Statistics in Competitive Examinations (Open Elective)*

Course Objectives

To train the students to solve the problems of statistics that appear in most of the competitive exams conducted by Banking, State and Central Governments and other agencies.

Course Outcomes (CO)

After the successful completion of the course, the students will be able to develop the data analysis skills required for Competitive Examinations.

Pedagogy

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

2. Students are encouraged to use resources available on open sources.

Contents

Unit 1: Collection Classification and Presentation of Statistical Data   (6 hours)

Primary and Secondary data, Methods of data collection; Tabulation of data; Graphs and charts; Frequency distributions; Diagrammatic presentation of frequency distributions.

Unit 2: Measures of Central Tendency and Dispersion   (12 hours)

Meaning of central tendency and essentials of a good measure of central tendency. Types of measures of central tendency, Arithmetic mean, Median, Mode, Geometric mean and Harmonic mean - definition, merits and demerits. Properties of arithmetic mean. Empirical relation between mean median and mode. Problems on both grouped and ungrouped data for all the measures.

Partition values-definition and types of partition values: quartiles, deciles and percentiles. Problems on Quartiles for grouped ungrouped data only.

Meaning and objectives of measures of dispersion. Essentials of a good measure of dispersion, absolute and relative measures of dispersion. Types of measures of

dispersion- Range, Quartile deviation, Mean deviation and standard deviation with relative measures – definition, merits and demerits. Properties of Standard deviation, simple problems on ungrouped and grouped data.

Unit 3: Aptitude Ability and Reasoning **(14 hours)**

Area, Banker's Discount, Surds and Indices, Ratio and Proportion, Simple Interest, Problems on Trains, Profit and Loss, Compound Interest.

Reasoning: Number series, Analogy, Classifications, Blood relations Coding-decoding, Puzzle test, Logical Venn diagram. Alphabet-test, Alpha-numerical sequence puzzle, Mathematical operations, Numbers, ranking & time sequence test, Logical sequence test, Arithmetical operations.

Unit 4: Introduction to Probability   (10 hours)

Introduction to probability, Basic concepts: Random experiment, Sample space, Mutually exclusive, exhaustive, equally likely events, complimentary events, classical, statistical and axiomatic definition of probability, properties, Addition theorem of Probability and Definition of independent, dependent events, Conditional probability, Multiplication theorem of Probability without proof. Simple numerical problems.

References

1. Freedman, D., Pisani, R. and Purves, R. (2014), Statistics, 4th Edition, W. W. Norton & Company.
2. Gupta S. C. Fundamentals of Statistics, Himalaya Publishing House, Bombay.
3. Gani S. G., Sankhyshastra and Ganakayantra. Udaya Ravi Publications, Bijapur.

Course Objectives

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

Course Outcomes (CO)

Students will be able to

CO1. Acquire the knowledge of statistical methods.

CO2.Identify types of data and visualization, analysis and interpretation.

CO3.Know about elementary probability and probability models.

CO4.Employ suitable test procedures for given data set.

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.

Contents

Unit 1: Introduction **(10 Hours)**

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 statistical 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.

Unit 2: Univariate and Bivariate Data Analysis **(10 Hours)**

Measures of Central Tendency: mathematical and positional. Measures of Dispersion: range, quartile deviation, mean 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 and fitting of polynomials and exponential curves.

Unit 3: 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).

Unit 4: 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, 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. MukhyopadyayaP(1999). Applied Statistics, New Central book Agency , Calcutta.

4. Ross,S.M.(2014) Introduction to Probability and Statistics For Engineers and Scientists.

5. Cochran, W G (1984): Sampling Techniques, Wiley Eastern, New Delhi.

Course Objectives

1. Provide an introduction to basics of statistics within a financial context.
2. To enable students to use statistical techniques for analysis and interpretation of business data.

Course Outcomes (CO)

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

CO1.Frame and formulate management decision problems.

CO2.Understand the basic concepts underlying quantitative

analysis.

CO3.Use sound judgment in the applications of quantitative methods to management decisions.

Pedagogy

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

2. Students are encouraged to use resources available on open sources.

Contents

Unit 1: 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.

Unit 2: Simple Correlation and Regression Analysis (10 Hours) Correlation Analysis: Meaning of Correlation: simple, multiple and partial; linear and non-linear, 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 regression lines, Regression equations and estimation; Properties of regression coefficients; Relationship between Correlation and Regression coefficients; Standard Error of Estimate and its use in interpreting the results.

Unit 3: 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.

Unit 4: 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, ratio of trend method, link relatives 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. McGraw Hill Education.

4. Gupta, S.P., and Archana Agarwal. Business Statistics, Sultan Chandand 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.

Course Objective

To train the students in the aspects of numerical ability, reasoning techniques and mental ability for competitive examinations conducted by various public and private boards.

Course Outcomes (CO)

After the successful completion of the course, the students will be able to develop the general skills required to Competitive Examinations.

Pedagogy

Activity based teaching and learning along with theoretical aspects using classroom teaching, group discussions and seminars.

Contents

Unit 1: Numerical Aptitude I   (10 hours)

Number Systems, Computation of Whole Numbers, Decimals and Fractions and relationship between Numbers, Fundamental arithmetical operations.

Unit 2: Numerical Aptitude II   (12 hours)

Percentages, Ratios and Proportions, Average, interest, Profit and Loss, Discount use of Tables and Graphs Time and Distance, Ratio and Time, Time and Work.

Unit 3: Reasoning and Mental Ability I   **(10 hours)**

Coding-Decoding, Symbol notations, Number Series, Analogy & Classification , Blood relations, Direction Sense, Liner arrangement.

Unit 4: Reasoning and Mental Ability II   (10 hours)

Ranking and Comparison, Input & output, Assumptions, Conclusion & Inferences.

References:

1. Aggarwal R.S., Quantitative Aptitude: by, Publication by S, Chand
2. Ningappa A H ,Mental Ability: Ashok Publication.