



RANI CHANNAMMA UNIVERSITY

BELAGAVI

**REVISED CURRICULUM FRAMEWORK FOR
UNDER GRADUATE COURSE**

STRUCTURE & SYLLABUS OF BACHELOR OF ARTS

APPLIED STATISTICS

1ST TO 2ND Semesters

w.e.f.

Academic Year 2024-25 and Onwards

Submitted by

Chairman,
Board of Studies (UG),
Bachelor of Arts,
Rani Channamma University, Belagavi.

B.A Applied Statistics (UG) Course Structure

Sem	Course Code	Title of the Paper	Teaching Hrs Per	Credits	Marks			Duration of Exam
					Sem Exam	IA	Total	
I	DSC1A	Basics Statistics	5hrs	3	80	20	100	3 hrs
II	DSC1B	Descriptive Statistics	5hrs	3	80	20	100	3 hrs

Regulations and Syllabus

For

APPLIED STATISTICS

In

Three Year B.A. Course

Regulation and Scheme of Instructions:

Regulations for governing three years semesterised bachelor degree programme of Rani Channamma University, Belagavi in Applied Statistics optional subject with effect from academic year 2024-2025.

I. Goals and Objectives:

The following aims have been kept in view while designing the syllabus of Bachelor's programme (BA) in applied statistics as one of the optional statistics.

1. To create an aptitude and bring statistical awareness among the students.
2. To train promising learners to teach Applied Statistics effectively at various level in the educational institutions.
3. To provide adequate Statistical knowledge and skills as required for the competitive examination.
4. To enrich and enhance analytical skill through Statistical techniques.
5. To make the subject student friendly, socially relevant and to cultivate research culture among the students.

II. Admission criteria:

Any candidate who have passed PUC/10+2 with any subjects are eligible to choose Applied Statistics as one of the optional subjects at the under graduate course. The other rules for admission are as per the university and government notifications from time to time.

III. Medium of Instruction:

The medium of instruction will be in English, however, the students are allowed to opt Kannada medium also.

IV. Attendance:

A minimum of 75% of attendance in each semester is compulsory.

V. Scheme of instruction:

1. The M.A/M.Sc./M. Stat. Master degree holders in Statistics can only teach Applied Statistics optional subject at UG level.
2. Applied Statistics as an optional subject at UG level which consists of six semesters. There will be one theory paper in I and II semester of 100 marks. The duration of teaching hours will be 5 hours per week in each paper.

VI. Scheme of Instruction:

1. Theory course shall carry 100 marks of which 80 marks allotted for semester end examination and 20 marks for internal assessment.
2. The semester end examination will be conducted by the university which will be of three hours duration and maximum 80 marks. The minimum passing marks in the examination is of 40 percent.
3. There shall be three sections in every question paper- A, B and C. Section A shall have 12 questions of each 2 marks and candidates have to solve 10 questions ($10 \times 2 = 20$ marks). Section B shall have 6 questions of each 5 marks and the candidate has to solve 6 questions only ($6 \times 5 = 30$ marks). Section C shall have 6 questions of each 10 marks and the candidate has to solve 4 questions as per instructions ($4 \times 10 = 40$ marks).

Question Paper Pattern in Applied Statistics (Optional) for all semester

Section A

I. Answer any **10** questions out of **12** questions (Q. No. 1 to 12)

10x2 = 20 Marks.

Section B

II. Answer any **4** questions out of **6** questions (Q. No. 13 to 18)

4x5 = 20 marks.

Section C

III. Answer any **4** questions out of **6** questions (Q. No. 19 to 24)

4x10 = 40 marks.

Total = 80 marks

COURSE: DSC1A (BA-I Semester)

Basic Statistics

MAX. MARKS: 100 (SEC- 80 + IA – 20)

Credits: 5

Teaching Hours: 60 Hours

Workload: 05 Hrs/ Week

Unit-I. Introduction to Statistics and Basic Concepts:

Meaning, origin, definition, functions and limitations of Statistics, applications in other subjects. Primary and secondary data. Methods of collection of primary data with merits and demerits. Meaning of questionnaire and schedule, Source of secondary data. Classification meaning and objectives of classifications. Types of classifications. Chronological, Geographical, Qualitative and Quantitative classifications. Explanation with examples, Explanation of range, 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 and objectives and Rules of tabulation, format of a table and brief explanation of parts of table. Types of table Preparation of tables of blank table and tables with numerical information

12 Hours

Unit-II. Diagrammatic and Graphical Representation of Data:

Diagrams : Meaning, importance of diagrams and general rules of construction of diagrams. Types of Diagrams – simple, multiple, Component, percentage bar diagrams and pie diagram. Problems on the construction of diagrams. Graphs: Types of Graphs – explanation of construction histogram and examples on obtaining mode from histogram. Method of construction of frequency Polygon and frequency curve. Ogives - method of construction of Ogives and problems obtaining the value of median and quartiles from less than Ogive. Difference between diagrams and graphs.

12 Hours

Unit-III. Measures of Central Tendency:

Meaning, types and functions of measures of central tendency. Essentials of a good measure of central tendency. Arithmetic mean definition, merits and demerits. Properties of arithmetic mean. Problems on both grouped and ungrouped data. Median-definition and merits and demerits. Problems on grouped and ungrouped and data. Mode –definition and merits and demerits. Problems on grouped and ungrouped data. Median Empirical relationship between mean, median and mode. Geometric mean-definition merits and demerits. Harmonic mean mean-definition merits and demerits. Partition values-definition and types of partition values , meaning of quartiles, deciles and percentiles. Problems on Quartiles for grouped ungrouped data only.

12 Hours

Unit-IV. Measures of Dispersion:

Meaning and objectives of measures of dispersion. Essentials of a good measure of dispersion, absolute and relative measures of dispersion. Range –definition, absolute and relative measures formulae. Examples on ungrouped data, Merits and demerits. Quartile Deviation definition, absolute and relative measures formulae. Merits and demerits Problems on grouped and ungrouped data. Mean Deviation definition, absolute and relative formulae, merits & demerits, simple problems on grouped and ungrouped data, Standard Deviation-definition and merits and demerits, Coefficient of Variation, Simple problems on grouped and ungrouped data on standard deviation and coefficient of variation.

12 Hours

Unit-V. Skewness and Kurtosis:

Skewness- Definition, objectives and types of skewness, explanation of positive skewness 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.

12 Hours

Books for Reference:

1. Sankhyshastra and Ganakayantra: by S. G Gani
2. Fundamentals of applied Statistics: by Gupta S C. and V K Kapoor :
3. Applied Statistics: Parimala Mukhyopadhyaya
4. Gupta S P. and V K Kapoor
5. Applied Statistics: by S.P.Gupta
6. Statistics Volume-1. by Raj Mohan

COURSE: DSC1B (BA–II Semester)

Descriptive Statistics

MAX. MARKS: 100 (SEC- 80 + IA – 20)

Credits: 5

Teaching Hours: 60 Hours

Workload: 05 Hrs/ Week

Unit-I. Index Numbers:

Definition, uses and limitations of index numbers. Brief description of the steps in the construction of index numbers, Classification of index numbers. Construction of Laspeyre's, Paasche's, Fishers, and Marshall – Edge worth's price and quantity index numbers. Tests of a index number-Unit test, time reversal test, factor reversal test and circular test. Verification of index numbers satisfying the time reversal and factor reversal tests. Problems on index numbers. Cost of living index numbers- meaning, uses and brief description of the steps involved in the construction of a cost of living index number. Methods of construction of cost of living index numbers-Aggregate expenditure method and Family budget method. Problems on cost of living index number. 12 Hours

Unit-II. Time Series:

Definition, uses, components of time series, brief explanation of the components of time series. Measurement of trend by graphical, semi average, moving averages method and problems on them. Method of least squares- Fitting of straight line trend –method, normal equations, obtaining trend values, estimating future trend and plotting the original and trend values on the graph. Fitting of second degree trend–Normal equations and obtaining trend line and making future estimates. 12 Hours

Unit-III. Correlation:

Definition, meaning of types of correlation-positive, negative, perfect and no correlation with examples. Utility of study of correlation analysis. Methods of studying correlation. Scatter diagram-definition and explanation with charts. Merits and demerits, problems regarding construction of scatter diagram. Karl Person's coefficient of correlation-definition, formulae, and properties of coefficient of correlation. Problems based on ungrouped data. Spearman's Rank coefficient of correlation-definition and explanation of method with merits and demerits. Problems with ties and without ties. 12 Hours

Unit-IV. Regression:

Definition of regression, regression equation of X on Y and Y on X, Properties of regression co-efficient and regression lines. Problems based on ungrouped data. Comparison between correlation and regression. 12 Hours

Unit-V. Association of Attributes:

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. 12 Hours

Reference Books :

1. Goon A.M., Gupta M.K.: Das Gupta B. (2005): Fundamentals of Statistics, Vol. I, World Press, Calcutta.
2. Mukhopadhyay.P, (2005): Applied statistics, New Central Book agency , Calcutta.
3. Gupta S.C and Kapoor V.K.: Statistical Methods-Sultan Chand & Sons Publications Delhi.

RANI CHANNAMMA UNIVERSITY, BELAGAVI



THE COURSE STRUCTURE & SYLLABUS

UNDER GRADUATE BACHELOR OF ARTS

STATISTICS

III and IV Semesters

w.e.f.

Academic Year 2025-26 and Onwards

Submitted By

Chairman
Board of Studies (UG)
Bachelor of Arts
Rani Channamma University, Belagavi

COURSE STRUCTURE FOR B.A.STATISTICS PROGRAMME

SEM	Subjects	Teaching Hours Per Week	Duration of Exam	Marks			Credits
				IA	Exam	Total	
III	Major 1Theory	5	3	20	80	100	5
	Major 2Theory	5	3	20	80	100	5
	Major 3Theory	5	3	20	80	100	5
	Language-I	4	3	20	80	100	3
	Language-II	4	3	20	80	100	3
	Elective 1- Statistics for competitive examination	3	2	10	40	50	2
	C-3 - EVS	4	2	10	40	50	2
		Total					

COURSE STRUCTURE FOR B.A.STATISTICS PROGRAMME

SEM	Subjects	Teaching Hours Per Week	Duration of Exam	Marks			Credits
				IA	Exam	Total	
IV	Major 1Theory	5	3	20	80	100	5
	Major 2Theory	5	3	20	80	100	5
	Major 3Theory	5	3	20	80	100	5
	Language-I	4	3	20	80	100	3
	Language-II	4	3	20	80	100	3
	Elective 2- Population Studies	3	2	10	40	50	2
	Skill 1 - Data Analysis with SPSS	4	2	10	40	50	2
		Total					

Regulations and Syllabus For APPLIED STATISTICS In Second Year B.A.Course

Regulation and Scheme of Instructions:

Regulations for governing three years semesterized Bachelor degree Programme of Rani Channamma University, Belagavi in Applied Statistics optional subject with effect from academic year 2025-2026.

I. Goals and Objectives:

The following aims have been kept in view while designing the syllabus of Bachelor's programme (BA) in Applied statistics as one of the optional statistics.

1. To create an aptitude and bring statistical awareness among the students.
2. To train promising learners to teach Applied Statistics effectively at various level in the educational institutions.
3. To provide adequate Statistical knowledge and skills as required for the competitive examination.
4. To enrich and enhance analytical skill through Statistical techniques.
5. To make the subject student friendly, socially relevant and to cultivate research culture among the students.

II. Admission criteria:

Any candidate who have passed PUC/10+2 with any subjects are eligible to choose Applied Statistics as one of the optional subjects at the undergraduate course. The other rules for admission are as per the university and government notifications from time to time.

III. Medium of Instruction:

The medium of instruction will be in English, however, the students are allowed to opt Kannada medium also.

IV. Attendance:

A minimum of 75% of attendance in each semester is compulsory.

V. Scheme of Instruction:

1. The M.A/M.Sc./M.Stat. Master degree holders in Statistics can only teach Applied Statistics optional subject at UG level.
2. Applied Statistics is an optional subject at UG level which consists of six semesters. There will be one theory paper in I and II semester of 100 marks. The duration of teaching hours will be 5 hours per week in each paper.

VI. General Pattern of Theory Question Paper:

1. Theory course shall carry 100 marks of which 80 marks allotted for semester end examination and 20 marks for internal assessment.
2. This semester end examination will be conducted by the university which will be of three hours duration and maximum 80 marks. The minimum passing marks in the examination is 40 percent.
3. There shall be three sections in every question paper - A, B and C. Section A shall have 12 questions of each 2 marks and candidates have to solve 10 questions ($10 \times 2 = 20$ marks). Section B shall have 8 questions of each 5 marks and the candidate has to solve 6 questions only ($6 \times 5 = 30$ marks). Section C shall have 4 questions of each 10 marks and the candidate has to solve 3 questions as per instructions ($3 \times 10 = 30$ marks).

B.A III SEMESTER

Probability and Standard Probability Distributions

Course Outcomes(COs)

At the end of the course the student should be able to:

1. To define and understand basic probability terms.
2. To grasp the concept of probability as a measure of uncertainty.
3. To learn different ways to assign probabilities.
4. To understand and apply set theory in the context of probability.
5. To understand the concept of random variables.
6. To identify the appropriate probability distribution for a given scenario.

B.A III SEMESTER

Probability and Standard Probability Distributions

Title of the Paper: Prob. and Standard Prob. Distributions	Total Marks: Th-80+ IA-20=100
Paper code BASTAT-T3	Teaching Hours:60Hours
Teaching Hours: 5 Hours/Week	Credits:05

Unit-I: Theory of Probability	15 Hrs.
Introduction to probability, definition of random experiment, outcomes, sample space, events, equally events, mutually exclusive events, exhaustive events, favorable events, complimentary events, independent events, dependent events, union and intersection of events with examples. Classical/mathematical, empirical/Statistical and axiomatic definitions of probability. Statements and proof of $p[\emptyset] = 0$, $P[S] = 1$ and $0 \leq P[A] \leq 1$. Statement and proof of addition theorem of probability for two non-mutually exclusive events and mutually exclusive events.. Conditional probability. Statement and proof of multiplication of theorem of probability for dependent and independent events. Simple numerical problems.	
Unit-II: Random Variables and Mathematical Expectation	15 Hrs.
Definition of discrete and continuous random variables with examples. Definition of probability mass function and probability density function. Definition of mathematical expectation, expected mean and variance of discrete random variable. Applications to find expectation of a discrete random variable and variance. Expectation and variance of the functions- a , ax , $ax+b$, where a and b are constants and related examples. Statement of addition and multiplication theorem of expectation.	

Unit-III: Binomial and Poisson Distributions	15 Hrs.
<p>Definition of Binomial variate, Binomial distribution and probability mass function. Properties of Binomial distribution. Examples of occurrence of Binomial distribution, expression for mean and variance of Binomial distribution. Given the mean and variance, finding the parameters. Fitting of Binomial distribution and obtaining expected probabilities. Simple problems.</p> <p>Definition of Poisson variate, Poisson distribution and probability mass function. Examples of occurrence of Poisson Distribution. Properties of Poisson distribution. Expression for mean and variance of 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.</p>	
Unit-IV: Normal Distribution	15 Hrs.
<p>Definition of normal variate, normal distribution, examples of occurrence of normal distribution, properties of normal distribution and importance of normal distribution, Definition of standard normal variate, standard normal distribution and properties of standard normal distribution. Statement of conditions under which binomial distribution tend to normal distribution. Finding probabilities and expected frequencies when mean and variance are given. Quartile deviation, mean deviation and standard deviation and problems.</p>	

Books for Reference:

1. S.G.Gani–A New Introductory Statistics Vol-II
2. S.C.Gupta and V.K.Kapoor–Fundamental of Mathematical Statistics.
3. S.C.Gupta-Fundamentals of Statistics.
4. S.P.Gupta-Statistical Methods.
5. D.C. Sanchethi and V. K. Kapoor- Statistics.
6. R.H. Dhareshwar & Sangeetashetti- Business Statistics

Elective-1: Statistics in Competitive Examinations

Course Outcomes(COs)

At the end of the course the student should be able to:

1. Understand types of data and methods of collecting data.
2. Prepare frequency distribution and tabulate the data, draw graphs and charts for frequency distribution.
3. Understand and calculate the measures of central tendency and Dispersion.
4. Develop the general skills required to Competitive Examinations.

B.A III SEMESTER

Elective-1: Statistics in Competitive Examinations

Title Of The Paper: Statistics in Competitive Examinations	Total Marks: TH-40+ IA-10=50
Paper code BASTAT-E1	TeachingHours:40 Hours
Teaching Hours: 3Hours/Week	Credits:02

UnitI: Collection Classification and Presentation of Statistical Data	10 hrs
Primary and Secondary data, Methods of data collection; Tabulation of data; Graphs and Charts; Frequency distributions; Diagrammatic presentation of frequency distributions.	
UnitII:Measures of Central Tendency and Dispersion	10 hrs
Common measures of central tendency- Mean, Median and Mode, Partition values- Quartiles, Deciles and Percentiles.	
UnitIII: Measures of Dispersion	10 hrs
Measures of Dispersion: Range, Quartile deviation, Mean deviation and standard deviation and their relative measures.	
UnitIV: Aptitude Ability and Reasoning	10 hrs
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.	

B.A IV SEMESTER**Inference and Exact Sampling Distributions****Course Outcomes (COs)**

At the end of the course the student will be able to:

- I. Understand the Principles of Statistical Inference:
- II. Master Exact Sampling Distributions.
- III. Apply Sampling Distributions to Statistical Inference:
- IV. Develop Critical Thinking and Problem-Solving Skills:

B.A IV SEMESTER

Title of the Paper: Inference and Exact Sampling Distributions	Total Marks: Th-80+ IA-20=100
Paper code BASTAT-T4	Teaching Hours: 60 Hours
Teaching Hours: 5 Hours/Week	Credits: 05

Unit-I: Sampling distribution	15 hrs
<p>Definition of population, parameter, sample, statistic, sampling distribution of a statistical along with examples. Definition of standard error. Standard error. Standard error of mean, standard deviation, proportion, difference of means and difference of proportions. Uses of standard error and simple problems.</p> <p>Estimation: Explanation of the terms – estimation, point estimation and interval estimation. Meaning of confidence interval, confidence limits and confidence coefficient with examples. Construction of 95% and 99% confidence interval for mean, difference of means, proportion and difference of proportions for large samples only. Numerical problems on the construction of 95% and 99% confidence limits for mean, difference mean, proportion and difference of proportions.</p>	
Unit-II: Testing of Hypothesis	15 hrs
<p>Explanation of terms – Statistical hypothesis, Null hypothesis, Alternative hypothesis, Level of significance, critical region, size of the test, power of the test with examples. Definition of type-I and type-II errors. Large sample tests-Test of significance of population mean, test of significance of equality of means of two populations, test of significance of two population proportion and test of significance of equality proportion of two populations.</p>	
Unit-III: Chi-Square Distribution	15 hrs
<p>Introduction to Chi-square distribution, definition of Chi-square variate. Properties of chi-square distribution. Applications of chi-square distribution. Chi-square test of goodness of fit. Problems on Chi-square test of Goodness of fit. Chi-square test of independence of attributes. Problems on Chi-square test of independence attributes.</p>	
Unit-IV: t-test and F-test	15 hrs
<p>Definition of t-statistic, assumptions of t-test, properties of t-distribution and applications of t-test. Application of t-test for testing population mean, equality of means and paired t-test. Definition of F-statistic, assumptions of F-test and properties of F-distribution. F-test for testing equality of variances of two normal populations.</p>	

Books for Reference:

1. Sankhyshastra and Ganakayantra:by S. G. Gani
2. Fundamentals of Applied Statistics–by Gupta SC. and V K Kapoor
3. Applied Statistics-by Parimala Mukhyopadhyaya
4. Applied Statistics-by Gupta SP. and V K Kapoor
5. Statistical Methods-by S.P. Gupta
6. Statistics Volume-1 by Raj Mohan

Elective 2: Population Studies

After completion of course, students will be able to:

CO1: Study the concepts of Vital Statistics, sources of data, different measures of Fertility, Mortality and migration.

CO2: Under stand the Growth rates-GRR and NRR and their interpretations.

Elective 2:Population Studies

Title Of The Paper: Population Studies	Total Marks: TH-40+ IA-10=50
Paper code BASTAT-E2	TeachingHours:40 Hours
Teaching Hours: 3Hours/Week	Credits:02

Unit-I: Introduction and Sources o f Population Data	10hrs
History, definition, nature and scope of population Studies. Sources of population data – salient features of Census, Civil Registration System, National Sample Surveys, Demographic Surveys, relative merits and demerits of these sources. Coverage and content errors. Use of balancing equations, Chandrasekar-Deming formula to check completeness of vital registration data, use of Whipple’s, Myer’s and UN indices.	
Unit-II: Fertility	10hrs
Basic concepts and terms used in the study of fertility. Measures of fertility-Crude Birth Rate (CBR), General Fertility Rate (GFR), Age Specific Fertility Rate (ASFR), Total Fertility Rate (TFR), Birth order statistics, Child Women ratio. Measures of reproduction- Gross Reproduction Rate (GRR) and Net Reproduction rate (NRR). Measurement of population growth rate- simple growth rate and compound growth.	
Unit III: Mortality	10hrs
Basic concepts and terms used in the study of mortality. Measures of mortality- Crude Death Rate (CDR), Age Specific Death Rate (ASDR), Direct and Indirect Standardized Death rates, Infant Mortality Rate (IMR), Under-five mortality Rate, Neo-natal mortality rate, Post-natal mortality rate; Maternal Mortality Rate (MMR).	
Unit-IV: Lifetables and Population change	10hrs
Life tables: Components of a life table, force of mortality and expectation of life table, types of life tables. Construction of life tables using Reed-Merrell’s method, Greville’s method. Uses of lifetables. Basic concepts and definition of population change, migration. Types of migration-internal and international, factors affecting migration. Rates and ratios of Migration- Indirect measures of net-internal migration, national growth rate method, residual method, push-pull factors Population estimates and projections.	

Books for References.

1. Barclay,G,W(1968).TechniquesofPopulationAnalysis,JohnWileyandSons, Incs.New York/London.
2. Keyfitz,H(1968).IntroductiontotheMathematicsofPopulation.Addison-WesleyPublishingCo.
3. Pathak,K.BandRam,F(1991).TechniquesofDemographicAnalysis,HimalayaPublishing House.
4. Ramakumar.R(1986).TechnicalDemography,WileyEasternLtd.
5. Srinivasan.K(1998).BasicDemographicTechniquesandApplications,SagePublication, New Delhi.
6. WunschG.J.&M.G. Tarmota(1978).Introduction toDemographicAnalysis,PlenumPress,N.Y.

Skill-1: DATA ANALYSIS WITH SPSS

Title Of The Paper: Data Analysis With SPSS	Total Marks: TH-40+ IA-10=50
Paper code: BSCSTAT-S1	TeachingHours:35 Hours
Teaching Hours: 3 Hours/Week	Credits:02

Course Outcome (CO):

After the completion of this course, students will be able to:

CO 1 : Use SPSS software for cleaning and presentation of data.

CO 2 : Present the data in the form of diagrams and graphs.

CO 3 : Analyze univariate, bivariate and multivariate data.

Unit-I : Introduction	10hrs
Need of SPSS, preparation of coding sheet of the questionnaire, defining the type of variable and data, constructing the database – defining variable name, type of variable, width of variable name, labeling, assigning the numeric value to the characteristic, declare measurement of scale of data. Data Editing in SPSS: Enter the data based on type of data case wise for different variables, defining the grouping of variable for repeated measures. transforming the data into same variable and different variable,	
Unit-II: Tabulation and Graphical representation	10hrs
Formation of frequency distribution, representation of frequency distribution by graphs, construction cross table, P-P plots and Q-Q Plot.	
Unit-III: Univariate, Bivariate and multivariate Data analysis	15 hrs
Calculation of Measures of central tendency, Dispersion, Karl-Pearson's correlation, Regression, fitting different curves difference of means for independent samples,	

Books for References:

1. Robert V. Hogg, Joseph W. McKean and Allen T. Craig (2007). Introduction to Mathematical Statistics, Pearson Education, Asia.
2. Irwin Miller and Marylees Miller, John E. Friends (2006). Mathematical Statistics with Applications, 7th Ed., Pearson Education, Asia.
3. Sheldon Ross (2007). Introduction to Probability Models, 9th Ed., Academic Press, Indian Reprint.
4. Gardener, M (2012). Beginning R: The Statistical Programming Language, Wiley Publications.
5. Cunningham, B.J (2012). Using SPSS: An Interactive Hands-on approach.

Rani Channamma University, Belagavi

Question Paper Pattern of UG Statistics

Major Theory T3 and T4

Time: 3 Hours

Max Marks : 80

PART-A

I. Answer any **10** questions

2X10=20

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.

PART-B

II. Answer any **4** questions

4X5=20

- 13.
- 14.
- 15.
- 16.
- 17.
- 18.

PART-C

III. Answer any **4** questions

4X10=40

- 19.
- 20.
- 21.
- 22.
- 23.
- 24.

Rani Channamma University, Belagavi
Question Paper Pattern of UG Statistics
Elective Theory E1, E2 and Skill-2

Time: 2 Hours

Max Marks : 40

PART-A

I. Answer any **10** questions

2X5=10

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.

PART-B

II. Answer any **6** questions

6X5=30

- 8.
- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.

RANI CHANNAMMA UNIVERSITY, BELAGAVI



THE COURSE STRUCTURE & SYLLABUS

UNDER GRADUATE BACHELOR OF ARTS

STATISTICS

V and VI Semesters

w.e.f.

Academic Year 2026-27 and Onwards

Submitted By

Chairman
Board of Studies (UG)
Bachelor of Arts
Rani Channamma University, Belagavi

COURSE STRUCTURE FOR B.A.STATISTICS PROGRAMME

SEM	Subjects	Teaching Hours Per Week	Duration of Exam	Marks			Credits
				IA	Exam	Total	
V	Major 1Theory	5+5	3	20	80	100	4+4
	Major 2Theory	5+5	3	20	80	100	4+4
	Major 3Theory	5+5	3	20	80	100	4+4
	Skill - II	4	2	10	40	50	2
		Total					

COURSE STRUCTURE FOR B.A.STATISTICS PROGRAMME

SEM	Subjects	Teaching Hours Per Week	Duration of Exam	Marks			Credits
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VI	Major 1Theory	5+5	3	20	80	100	4+4
	Major 2Theory	5+5	3	20	80	100	4+4
	Major 3Theory	5+5	3	20	80	100	4+4
	Skill -III	4	2	10	40	50	2
		Total					

Regulations and Syllabus

For

APPLIED STATISTICS

In Third Year B.A. Course

Regulation and Scheme of Instructions:

Regulations for governing three years semesterized Bachelor degree Programme of Rani Channamma University, Belagavi in Applied Statistics optional subject with effect from academic year 2025-2026.

I. Goals and Objectives:

The following aims have been kept in view while designing the syllabus of Bachelor's programme (BA) in Applied statistics as one of the optional statistics.

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1. The M.A/M.Sc./M.Stat. Master degree holders in Statistics can only teach Applied Statistics optional subject at UG level.
2. Applied Statistics is an optional subject at UG level which consists of six semesters. There will be one theory paper in I and II semester of 100 marks. The duration of teaching hours will be 5 hours per week in each paper.

VI. General Pattern of Theory Question Paper:

1. Theory course shall carry 100 marks of which 80 marks allotted for semester end examination and 20 marks for internal assessment.
2. This semester end examination will be conducted by the university which will be of three hours duration and maximum 80 marks. The minimum passing marks in the examination is 40 percent.
3. There shall be three sections in every question paper-A, B and C. Section A shall have 12 questions of each 2 marks and candidates have to solve 10 questions ($10 \times 2 = 20$ marks). Section B shall have 8 questions of each 5 marks and the candidate has to solve 6 questions only ($6 \times 5 = 30$ marks). Section C shall have 4 questions of each 10 marks and the candidate has to solve 3 questions as per instructions ($3 \times 10 = 30$ marks).

B.A. Semester–V

Course Title: Theory of Sampling (P-I)

Course Outcomes (COs):

At the end of the course students will be able to:

CO1: Understand the principles underlying sampling as a means of making inferences about a population.

CO2: Understand the need, advantages and limitations of sampling.

CO3: Understand different sampling techniques.

CO4: Learn to estimate population parameters from a sample.

CO5: Apply Simple Random Sampling Techniques for sample selection.

CO6: Compare proportional and optimum allocation in stratified sampling.

CO7: Understand sampling distribution of sample mean and proportions.

CO8: Apply Systematic Random Sampling Techniques and evaluate their efficiency.

CO9: Develop critical thinking in selecting appropriate sampling techniques for research studies.

COURSE CODE:

Theory of Sampling (P-I)

MAX.MARKS:100(SEC-80+IA– 20)

Credits: 5

Teaching Hours: 60 Hours

Workload: 05Hrs/Week

Unit	Title: Theory of Sampling	60hrs/ sem
Unit-I	Introduction to Sampling Theory: Meaning of population, population size, finite population, infinite population, sample, sample size, sampling, sampling technique, sampling unit, sampling frame, census and sample survey, Advantages of sampling over complete census, examples of sampling. Types of errors in sample survey, sampling errors and non-sampling errors, response errors, nonresponse errors and Tabulation errors. Limitations of sampling. Planning of sample survey and its execution.	15hrs
Unit-II	Simple Random Sampling: Introduction and Definition of Simple Random Sampling (SRS), Notations and formulae for estimating population mean, total and estimate of variance of the estimates. Methods of obtaining simple random sample-Lottery method and Random number stable method. Merits and demerits of Simple Random Sampling. Simple problems on simple random sampling method.	15hrs

Unit-III	<p>Stratified Random Sampling: Need for stratification, stratifying factors, advantages of stratified random sampling over SRS, Definition of strata, and stratified random sampling. Notations and formulae for estimating population mean, total and estimate of variance of the estimates. Methods of allocation of sample size in different strata- Proportional allocation and Optimum allocation. Determination of Bowley's formula for proportional allocation and Neyman's formula for optimum allocation. Advantages and disadvantages of stratified random sampling method. Simple problems on Stratified random sampling method.</p>	15hrs
Unit-IV	<p>Systematic Random Sampling: Definition of systematic random sampling. Explanation of methods of obtaining systematic random samples. Examples of systematic random sample. Formulae for estimating population mean, total and variance. Applications of systematic random sampling method. Merits and demerits of systematic random sampling method. Simple problems on systematic random sampling method.</p>	15hrs

Recommended books:

1. Bansilal and Arora, S.R.: Mathematics of Probability & Statistics, R. Chand & Co., New Delhi.
2. Goon, A.M., Gupta, M.K. and Dasgupta, B.: An Outline of Statistical Theory, Volume I and II. The World Press Private Limited, Calcutta.
3. Gupta C.B., (2004). Introduction to Statistical Methods, Vikas Publishing House, PVT. Ltd.
4. Gupta S.P., Statistical Methods, Sultan Chand and sons, New Delhi.
5. Gupta S.C. and Kapoor V.K.: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
6. Gupta, S.C.: Fundamentals of Statistics, Himalaya Publishing House, Bombay.
7. Kalyan Kumar Mukherjee: Probability and Statistics, New Central Book Agency (P) Ltd., Calcutta.
8. Ray & Sharma: Mathematical Statistics, Ram Prasad & Sons, Agra.
9. S.G. Gani, Sankhyashastra and Ganakayantra- Publication, Bijapur.

B.A. Semester–V

Course Title: Population Studies and Industrial Statistics (P-II)

Course Out comes (COs):

At the end of the course students will be able to:

- CO1: Understand official statistical system in India and their functions.
- CO2: Understand the census operations and characteristics available in census data.
- CO3: Study the collection of census data by different methods.
- CO4: Know the different sample survey organizations and their functions in India.
- CO5: Study the different measures of Fertility.
- CO6: Study the different measures of mortality and their policies.
- CO7: Know different reproductive rates.
- CO8: Construct control chart for variables.
- CO9: Construct control chart for attributes.

COURSE CODE:

Population Studies and Industrial Statistics (P-II)

MAX.MARKS:100(SEC-80+IA– 20)

Credits: 5

Teaching Hours: 60 Hours

Workload: 05Hrs/Week

Unit	Title: Population Studies and Industrial Statistics	60hrs/ sem
Unit-I	<p>National Population Census: Definition of National Population census, official system in India for census enumeration. Reference point of time. Methods of collecting census data – Household method, Canvasser method and Mailed questionnaire method, their merits &demerits. Framing of census questionnaire.</p> <p>Census Survey: Methods of conducting census survey. De-facto method and D-jure method, their merits and demerits. Distinction between D-facto and D-jure methods of conducting census. Functions and aims of census. Changes introduced in the household schedule of 2001 and 2011 census.</p>	15hrs
Unit-II	<p>Population Studies and Measures of Fertility: Meaning of population studies. Definition of vital event and vital Statistics. Sources of vital Statistics-Census enquiry, Registration method, Sample survey, Hospital records and Research and analysis. Uses of Vital Statistics. Merits and demerits. Fertility measure-Distinction Between fertility and fecundity. Measures of fertility-Crude Birth Rate (CBR), General fertility Rate</p>	15hrs

	(GFR), Age Specific Fertility Rate (ASFR) and Total fertility Rate (TFR) - definition, merits and demerits, computation and interpretation. Growth Rate – Gross Reproduction Rate (GRR) and Net Reproduction Rate (NRR) – definition, merits and demerits, calculations of the measures and interpretation, Difference between GRR and NRR. Simple numerical problems.	
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Unit-III	Measurement of Mortality: Introduction of Mortality, Mortality rates–Crude Death Rate (CDR), Age Specific Death Rate (ASDR) and Standardized Death Rate (STDR) -Definition, uses, merits and demerits, Computation of the measures and interpretation, Infant mortality rate (IMR), Neo-Natal Morality Rate (NNMR) and Maternal Mortality Rate (MMR)–meaning and simple problems.	15hrs
Unit-IV	Industrial Statistics: Meaning of Statistical Quality Control and its uses and limitations. Causes of variations-chance causes and assignable causes with illustrations. Process and Product control with examples. Explanation of control chart and control limits, general procedure for drawing control charts (3-sigmalimits). Types of control charts- control chart for variables -Construction of \bar{X} and R charts when standards are given and not given. Simple problems. Control charts for attributes – Fraction defective p-chart and No. of defects per unit C-chart, Basis of construction. Simple numerical problems.	15hrs

Recommended books:

1. Goon, A. M., Gupta, M. K. and Dasgupta, B.: An Outline of Statistical Theory, Volume I and II. The World Press Private Limited, Calcutta.
2. Grant, E. L. and Richard S. Leavenworth: Statistical Quality Control, McGraw-Hill Book Company Inc., New York.
3. Gupta C.B.,(2004)Introduction to Statistical Mehods,Vikas Publishing House, PVT. Ltd,
4. Gupta,R.C.: Statistical Quality Control, Khanna Publishers, New Delhi.
5. Gupta, S.C. and Kapoor, V.K.: Fundamentals of Applied Statistics, Sultan Chand & Sons, New Delhi.
6. Gupta,S.C.: Fundamentals of Statistics, Himalaya Publishing House, Bombay.
7. Mahajan ,M: Statistical Quality Control, Dhanpat Rai & Co. Ltd. New Delhi.
8. Montgomery DouglasC.: Introduction to Statistical Quality Control, JohnWiley & Sons, Inc.(Wiley Student Edition).
9. Trivedi K. S., Probability and Statistics with Reliability, Queuing and Computer Science Applications, PHI, 1997.

B.A. – V SEMESTER

Research Methodology - I (SKILL-II)

MAX. MARKS: 50 (SEC- 40 + IA – 10)

Credits: 2

WL/ WEEK: 04Hours

Unit	Research Methodology - I (SKILL-II)	40 hrs/ sem
Unit-I	Introduction to Research: Meaning, objectives, types of research (descriptive, experimental, exploratory), and the research process. Emphasizes scientific methods and formulation of research problems in statistical contexts.	10hrs
Unit-II	Research Design and Formulation: Explores research design principles, literature review, hypothesis development, and identifying research gaps. Includes basic models for statistical research planning.	10hrs
Unit-III	Sampling Techniques: Details sampling methods (probability: simple random, stratified, cluster; non-probability: convenience, purposive), sample size determination, and sampling errors relevant to statistics.	10hrs
Unit-IV	Data Collection Methods: Discusses primary (questionnaires, interviews, observation) and secondary data sources, questionnaire design, scaling techniques, and pilot testing for statistical studies.	10hrs

B.A. Semester–VI

Course Title: Analysis of Variance and Design of Experiments (P-I)

Course Outcomes (COs):

At the end of the course students will be able to:

CO1: Understand one-way classified data in ANOVA.

CO2: Understand two-way classified data in ANOVA.

CO3: Apply ANOVA techniques to real-life data sets.

CO4: Learn the principles of experimentation-randomization, replication and local control.

CO5: Analyze Completely Randomized Design (CRD).

CO6: Evaluate Randomized Block Design (RBD).

CO7: Handle missing observations in RBD

CO8: Develop analytical and decision making skills in planning and conducting experiments.

COURSE CODE:

Analysis of Variance and Design of Experiments (P-I)

MAX.MARKS:100(SEC-80+IA– 20)

Credits: 5

Teaching Hours: 60 Hours

Workload: 05Hrs/Week

Unit	Title: Analysis of Variance and Design of Experiments	60 hrs/sem
Unit-I	Analysis of Variance: One-Way Classification: Definition of analysis of variance and its basic assumptions. Meaning of assignable and chance variations. ANOVA for one-way classified data-definition, linear mathematical model, assumptions, statement of hypothesis, splitting up of total sum of squares into various component sum of squares, degrees of freedom and ANOVA table. Simple Numerical problems on one-way classified data.	15hrs
Unit-II	Two-Way Classification: Analysis of variance for two way classification – definition, linear mathematical model, assumptions, statement of hypothesis, splitting up of total sum of squares into various component sum of squares. Degrees of freedom and ANOVA table. Simple numerical problems on two way Classified data.	15hrs

Unit-III	Design of Experiments: Completely Randomized Design: Definition of terms - Experiment, treatment, experimental unit, experimental material, yield, block, precision, experimental error, uniformity trails, and efficiency. Basic principles of design of experiments-Replication Randomization and Local control. Completely Randomized Design (CRD)-definition, layout, linear mathematical model, assumptions, hypothesis, splitting up of sum of squares into various component sum of squares, degrees of freedom and ANOVA table. Merits, demerits and applications of CRD. Simple numerical problems.	15hrs
Unit-IV	Randomized Block Design: Introduction and definition of Randomized Block Design (RBD), layout, linear mathematical model, assumptions, statistical hypothesis, splitting up of total sum of squares into various component sum of squares, degree of freedom, and ANOVA table. Merits and demerits of RBD. Applications of RBD. Comparison between CRD and RBD. Simple problems.	15hrs

Recommended books:

1. Gupta S.C. and Kapoor, V.K.: Fundamentals of Applied Statistics, Sultan Chand & Sons, New Delhi.
2. Goon, A.M., Gupta, M.K. and Dasgupta, B.: An Outline of Statistical Theory, Volume I and II. The World Press Private Limited, Calcutta.
3. Gupta, S.C.: Fundamentals of Statistics, Himalaya Publishing House, Bombay.
4. Montgomery, D.C.: Design and Analysis of Experiments, John Wiley & Sons, New York.
5. Das M.N. and Giri, N: Design of Experiments, Theory and Applications, Wiley Eastern Ltd. New Delhi.

B.A.Semester–VI

Course Title: Operations Research (P-II)

Course Outcomes (COs):

At the end of the course students will be able to:

- CO1: Understand the origin, development and scope of O R.
- CO2: Finding the solution of L.P.P by graphical method.
- CO3: Understand the concept and structure of a transportation problem.
- CO4: Determine Initial Basic Feasible Solutions (IBFS)
- CO5: Convert unbalanced Transportation problem into balanced form.
- CO6: Understand the concept and mathematical structure of Assignment Problem.
- CO7: Apply assignment techniques in job allocation, scheduling and resource management.
- CO8: Know the types of games and their solutions by different methods.

COURSE CODE:

Operations Research (P-II)

MAX.MARKS:100 (SEC-80+IA– 20)

Credits: 5

Teaching Hours: 60 Hours

Workload: 05Hrs/Week

Unit	Title: Operations Research	60hrs/ sem
Unit-I	Linear Programming Problem: Origin, development, definition and applications of Operations research. Definition of LPP and statement of the general linear programming problem. Definition of terms- Objective function, feasible solution and Optimal solution. Mathematical formulation of linear programming problem in case of two variables with examples. Graphical method of solving LPP and merits and demerits. Simple numerical problems.	15hrs
Unit-II	Transportation Problem: Introduction, definition of Transportation Problem (TP), balanced and unbalanced TP. Feasible solution, basic solution, basic feasible solution, degenerate solution, non-degenerate solution and optimal solution. Methods of finding initial basic feasible solution-North West Corner Rule, Matrix Minima method (lowest cost entry method) and Vogel's approximation method(Unit cost penalty method) and Simple problems.	15hrs

Unit-III	Assignment Problem: Introduction and definition of Assignment problem, mathematical model, balanced and unbalanced assignment problem, Hungarian method of solving an AP, Distinction between Transportation Problem & Assignment Problem. Simple numerical problems on assignment.	15hrs
Unit-IV	Game Theory: Introduction, two person zero sum games, Pure and mixed strategies, maxmin and minimax principle, games with saddle point and without saddle points, solution of 2x2 games, rectangular games-2xn and mx2 by graphical method of solving a game, dominance rule. Simple numerical problems.	15hrs

Recommended books:

1. Churchman, C.W., Ackoff, R.L., and Arnoff, E.L.: Introduction to Operations Research, John Wiley Pub.
2. Dr. Goel, B.S. and Dr. Mittal, S.K.: Operations Research, Pragati Prakashan, Meerut.
3. Frederick S. Hillier & Gerald J. Liberman: Introduction to Operations Research (Eighth Edition), Tata
4. Gupta, P.K. and Hira, D.S.: Operations Research, S. Chand & Company Ltd., New Delhi.
5. Gupta, R.K.: Operations Research, Krishna Prakashana Mandir, Meerut.
6. Kanti Swarup, Gupta, P.K. and Man Mohan: Operations Research, Sultan Chand & Sons, New Delhi.
7. Kapoor, V.K.: Operations Research Problems & Solutions, Sultan Chand & Sons, New Delhi.
8. Mustafi, C.K.: Operations Research Methods and Practice, New Age Pub. New Delhi.
9. Sharma, S.D.: Operations Research, Kedarnath Ramnath & Co. Publishers, Meerut.

B.A. – VI SEMESTER

Research Methodology - II (SKILL-III)

MAX. MARKS: 50 (SEC- 40 + IA – 10)

Credits: 2

WL/ WEEK: 04Hours

Unit	Research Methodology - II (SKILL-III)	40 hrs/ sem
Unit-I	Data Processing and Descriptive Statistics: Focuses on data cleaning, coding, tabulation, graphical representation, and measures of central tendency, dispersion, skewness in research data.	10hrs
Unit-II	Inferential Statistics: Introduces estimation, confidence intervals, hypothesis testing (null/alternative, errors), and tests like t-test, z-test, chi-square for large/small samples.	10hrs
Unit-III	Correlation, Regression, and ANOVA: Covers Pearson/Spearman correlation, simple/multiple regression analysis, and one-way ANOVA applications in research.	10hrs
Unit-IV	Report Writing and Interpretation: Outlines research report structure, interpretation of results, use of tables/graphs, referencing, and ethical considerations in statistical reporting.	10hrs

B.Sc. – VI SEMESTER

COURSE CODE: 2A6STAM06P

PROJECT

MAX. MARKS: 50 (SEC- 40 + IA – 10)

Credits:2

WL/ WEEK: 02Hours

General Guidelines:

1. **Topic Selection:** Choose a topic related to statistics such as data analysis, surveys, forecasting, or statistical modeling with the approval of the faculty guide.
2. **Data Collection:** Collect reliable data through surveys, experiments, secondary sources, or official reports.
3. **Use of Statistical Tools:** Apply appropriate statistical methods such as mean, median, correlation, regression, hypothesis testing, etc.
4. **Software Use:** Use statistical software or tools such as Excel, R, SPSS, or Python for analysis if required.
5. **Interpretation:** Clearly interpret the statistical results and explain their practical meaning.
6. **Report Preparation:** Prepare a report including introduction, objectives, data sources, methodology, analysis, results, and conclusion.
7. **Original Work:** Ensure the work is original and properly cite sources of data.
8. **Presentation:** Be prepared to present the findings and explain the statistical methods used.

Rani Channamma University, Belagavi

Question Paper Pattern of UG Statistics Major Theory T (5A and 5B) and T(6A and 6B)

Time: 3 Hours

Max Marks: 80

PART-A

I. Answer any **10** questions

2X10=20

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.

PART-B

II. Answer any **4** questions

4X5=20

- 13.
- 14.
- 15.
- 16.
- 17.
- 18.

PART-C

III. Answer any **4** questions

4X10=40

- 19.
- 20.
- 21.
- 22.
- 23.
- 24.

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Question Paper Pattern of UG Statistics

Research Methodology (SEC)

Time: 2 Hours

Max Marks: 40

PART-A

I. Answer any **5** questions

5X20=10

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

PART-B

II. Answer any **3** questions

3X5=15

- 7.
- 8.
- 9.
- 10.
- 11.

PART-C

III. Answer any **1** questions

1X5=15

- 12.
- 13.

Research Methodology (SEC) - End Semester Exam

Time: 2 Hours* | *Max Marks: 40

(Internal Assessment: 10 Marks - Assignments, Seminars, Tests)

Section A: Short Answer (10 marks - Answer all, 2 marks each)

1. Define research and its objectives.
2. Differentiate between population and sample.
3. What is a null hypothesis?
4. State any two types of sampling.
5. Explain mean and median.
6. What is chi-square test?

Section B: Medium Answer (15 marks - Answer any 3, 5 marks each)

7. Discuss steps in formulating a research problem.
8. Explain probability sampling techniques with examples.
9. Describe measures of central tendency and their uses.
10. How to design a good questionnaire?
11. Outline the steps in hypothesis testing.

Section C: Long Answer (15 marks - Answer any 1, 15 marks)

12. Explain the research process with a statistical example. Discuss sampling and data collection.
13. Describe descriptive and inferential statistics. Illustrate with correlation and regression.