



**BAGALKOT UNIVERSITY  
JAMKHANDI**

**PROGRAM /COURSE STRUCTURE AND SYLLABUS  
For**

**Bachelor of Science with STATISTICS  
I and II Semester**

**w.e.f.  
Academic Year 2024-25 and onwards**

## PROGRAM STRUCTURE

Syllabus and Credits Structure under Choice Based Credit System [CBCS] General Degree for the Three Years B.Sc. with Statistics Undergraduate Programme with effect from 2024-25

### First Semester B.Sc. With Statistics Scheme

<b>SEMESTER-I</b>											
<b>Category</b>	<b>Course code</b>	<b>Title of the Paper</b>	<b>Marks</b>			<b>Teaching hours/ week</b>			<b>Credits</b>	<b>Duration of Exam (Hrs.)</b>	<b>Teaching Department</b>
			<b>IA</b>	<b>SEE</b>	<b>Total</b>	<b>L</b>	<b>T</b>	<b>P</b>			
L1	-----	Language 1	20	80	100	4	-	-	3	3	-
L2	-----	Language 2	20	80	100	4	-	-	3	3	-
Major	2A1STAM01T	Descriptive Statistics and Probability Theory	20	80	100	4	-	-	3	3	Statistics
	2A1STAM01L	Descriptive Statistics and Probability Theory Practical I	10	40	50	-	-	4	2	3	Statistics
Major	-----	Major Subject 2	20	80	100	4	-	-	3	3	---
	-----	Practical	10	40	50	-	-	4	2	3	---
Major	-----	Major Subject 3	20	80	100	4	-	-	3	3	---
	-----	Practical	10	40	50	-	-	4	2	3	---
Common	2S1XXXC01T	Constitutional Values	10	40	50	2	-	-	2	2	Constitutional Values: Political Science
	2S1XXXC02T	Environment studies									Environmental Studies: Chemistry/ /Geography/ Botany
<b>Total Marks</b>					<b>700</b>	<b>Semester Credits</b>			<b>23</b>		

## Second Semester B.Sc. With Statistics Scheme

SEMESTER-II											
Category	Course code	Title of the Paper	Marks			Teaching hours/ week			Credits	Duration of exams (Hrs.)	Teaching Department
			IA	SE E	Total	L	T	P			
L3	-----	Language 3	20	80	100	4	-	-	3	3	-
L4	-----	Language 4	20	80	100	4	-	-	3	3	-
Major	2A2STAM02T	Bivariate data Analysis and Theoretical distributions	20	80	100	4	-	-	3	3	Statistics
	2A2STAM02L	Bivariate data Analysis and Theoretical distributions Practical II	10	40	50	-	-	4	2	3	Statistics
Major	-----	Major Subject 2	20	80	100	4	-	-	3	3	---
	-----	Practical	10	40	50	-	-	4	2	3	---
Major	-----	Major Subject 3	20	80	100	3	-	-	3	3	---
	-----	Practical	10	40	50	-	-	4	2	3	---
Common	2S1XXXC01T	Constitutional Values	10	40	50	2	-	-	2	2	Constitutional Values: Political Science
	2S1XXXC02T	Environment Studies									Environmental Studies: Chemistry/ Geography / Botany
<b>Total Marks</b>					<b>700</b>	<b>Semester Credits</b>			<b>23</b>		

<b>Year</b>	I	<b>Course Code: : 2A1STAM01T</b>		<b>Credits</b>	03
<b>Sem.</b>	1	<b>Paper Title: Descriptive Statistics and Probability Theory</b>		<b>Hours</b>	52
Internal Assessment Marks: 20		External Assessment Marks: 80		Duration of Exam: 03hrs.	
<b>Unit No.</b>	<b>Course content :</b>				<b>Hours</b>
<b>Unit I</b>	Introduction: Definition and scope of Statistics, concept to population and sample. Data-qualitative and quantitative, variables and attributes. Measurement scales - nominal, ordinal, interval and ratio. Presentation- classification & tabulation, frequency distribution. Diagrams- simple, multiple, subdivided and percentage. Graphs- histogram, frequency polygon, frequency curve, ogives.				13 Hours
<b>Unit II</b>	Measures of Central tendency :Purpose of measures of location, definition of A.M,G.M, H.M& their properties(with proof),median and mode. Partitioned values-quartiles, deciles and percentiles. Measures of Dispersion: Absolute and relative measures-range, quartile deviation, mean deviation, standard deviation and coefficient of variation. Moments, skewness and kurtosis.				13 Hours
<b>Unit III</b>	Probability: Introduction, random experiments, sample space, events and algebra of events. Definitions of probability- classical, statistical, and axiomatic. Conditional probability, laws of addition and multiplication, independent events, theorem of total probability, Bayes' theorem and its applications.				13 Hours
<b>Unit IV</b>	Random variable: Discrete and continuous random variable, p.m.f., p.d.f. and c.d.f., illustrations and properties of random variables, univariate transformations with illustrations. Two dimensional random variables: discrete and continuous type, joint, marginal and conditional p.m.f. p.d.f. and c.d.f. independence of variables, bivariate transformations with illustrations				13 Hours

### Recommended Learning Resources

1. Goon A.M., Gupta M.K. and Dasgupta B. (2002): Fundamentals of Statistics, Vol. I & II, 8th Edition. The World Press, Kolkata.
2. Miller, Irwin and Miller, Marylees (2006): John E. Freund's Mathematical Statistics with Applications, (7th Edn.), Pearson Education, Asia.
3. Mood, A.M., Graybill, F.A. and Bose, D.C. (2007): Introduction to the Theory of Statistics, 3rd Edn., (Reprint), Tata McGraw -Hill Pub. Co. Ltd.
4. Gupta S.C and Kapoor V.K.: Fundamentals of Mathematical Statistics- Sultan Chand & Sons publications.
5. Hogg, R.V. and Craig, A.T (1978): Introduction to Mathematical Statistics. Amerind Publishing Company.
6. Ross S. M. (2014). Introduction to probability and Statistics for Engineers and Scientists. 5<sup>th</sup> Edition, Academic Press.
7. Rohatagi, V. K.: An introduction to probability theory and mathematics statistics. Wiley Eastern Ltd, New Delhi.

<b>Year</b>	I	<b>Course Code: 2A1STAM01L</b> <b>Course Title: : Descriptive Statistics and Probability Theory</b> <b>PRACTICALS I</b>	<b>Credits</b>	02
<b>Sem.</b>	1		<b>Hours</b>	50
Internal Assessment Marks: 10		External Assessment Marks: 40	Duration of Exam: 03hrs.	
<b>Unit No.</b>	<b>Course content</b>			<b>Hours 50</b>
	<p style="text-align: center;"><b>List of Practical (Computing all the practical manually and using MS Excel)</b></p> <ol style="list-style-type: none"> <li>1. Construction of frequency distribution and graphical representation.</li> <li>2. Measures of central tendency-I Computation of AM, GM and HM</li> <li>3. Measures of central tendency-II Computation of positional averages and partition values.</li> <li>4. Measures of dispersion– I</li> <li>5. Measures of dispersion– II</li> <li>6. Moments, skewness and kurtosis for a frequency distribution.</li> <li>7. Probability – I</li> <li>8. Probability – II</li> <li>9. Plotting p.m.f and sketching of pdf.</li> <li>10. One dimensional random variables and two dimensional random variables.</li> </ol>			

<b>Year</b>	I	<b>Course Code: 2A2ATAM02T</b>		<b>Credits</b>	03
<b>Sem.</b>	II	<b>Course Title : Bivariate Data Analysis and Theoretical Distribution</b>		<b>Hours</b>	52
Internal Assessment Marks: 20		External Assessment Marks: 80		Duration of Exam: 03hrs.	
<b>Unit No.</b>	<b>Course content</b>				<b>Hours</b>
<b>Unit I</b>	Mathematical Expectation of single and bivariate random variables, its properties. Addition and multiplication theorem of expectation. Moments and Cumulants. MGF and CGF - their properties, conditional expectation, variance, covariance, mean and variance of linear combination of random variables				13 Hours
<b>Unit II</b>	<b>Bivariate data:</b> Definition, scatter diagram, simple, Karl Pearson's correlation coefficient, Spearman's Rank correlation coefficient, Properties, concept of errors, principles of leastsquares, simple linear regression and its properties, fitting of regression lines, coefficient of determination. <b>Multivariate (Trivariate) Data Analysis:</b> Multivariate data visualization: Mean vector and Dispersion matrix, Multiple linear regression, multiple and partial correlation coefficients. Residuals and their properties.				13 Hours
<b>Unit III</b>	Discrete probability Distributions: Bernoulli, Binomial, Poisson, Negative Binomial, Geometric and Uniform, distributions - definition, mean, variance and m.g.f., c.g.f and moments upto fourth order only. Hyper geometric distribution: definition, mean and variance. Recurrence relation for probabilities and moments of Binomial and Poisson distributions. Approximations of binomial, negative binomial and hyper geometric distributions				13 Hours
<b>Unit IV</b>	Continuous Probability Distributions: Uniform, Gamma, Beta, Exponential, Normal and Cauchy distributions - Mean, variance, moments, MGF and Properties.				13 Hours

<b>Year</b>	I	<b>Course Code: 2A2STAM02L</b>	<b>Credits</b>	02
<b>Sem.</b>	II		<b>Course Title: Bivariate Data Analysis and Theoretical Distribution PRACTICALS II</b>	<b>Hours</b>
Internal Assessment Marks: 10		External Assessment Marks: 40		Duration of Exam: 03hrs.
<b>Unit No.</b>	<b>Course content</b>			<b>Hours 50</b>
	<p><b>(Computing all the practical manually and using MS Excel)</b></p> <ol style="list-style-type: none"> <li>1. Problems on Mathematical Expectation.</li> <li>2. Bivariate distributions: Computation of marginal and conditional distributions.</li> <li>3. Correlation: Computation of Karl Pearson's correlation coefficient,</li> <li>4. Correlation: Computation of Rank correlation coefficient.</li> <li>5. Fitting of regression equations.</li> <li>6. Partial correlation</li> <li>7. Multiple correlation.</li> <li>8. Fitting of Binomial distributions</li> <li>9. Fitting of Poisson distributions.</li> <li>10. Fitting of normal distribution.</li> </ol>			



### Recommended Learning Resources

1. Hogg, R. V., Tanis, E. A. and Rao J. M. (2009): Probability and Statistical Inference, Seventh Edition, Pearson Education, New Delhi.
2. Miller, Irwin and Miller, Marylees (2006): John E. Freund's Mathematical Statistics with Applications, (7th Edn.), Pearson Education, Asia.
3. Myer, P. L. (1970): Introductory Probability and Statistical Applications, Oxford & IBH Publishing, New Delhi.
4. Gupta S. C and Kapoor V. K.: Fundamentals of Mathematical Statistics- Sultan Chand & Sons
5. Ross S. M. (2014). Introduction to probability and Statistics for Engineers and Scientists. 5<sup>th</sup> Edition, Academic Press.
6. Rohatagi, V. K.: An introduction to probability theory and mathematical statistics. Wiley Eastern Ltd, New Delhi.
7. Mukhopadya P. (1996) Mathematical Statistics, New central Book agency (P) Ltd, Kolkata.