# Sant Gadge Baba Amravati University, Amravati Syllabus Prescribed under Choice based Credit System 2022-23 Faculty : Humanities

## Programme: B.A. (Statistics)

### **Course/ Subject : Statistics**

#### Part A

#### **PSOs:**

1.Critical Thinking: Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.

2.Effective Communication: Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.

3. Social Interaction: Elicit views of others, mediate disagreements and help reach conclusions in group settings.

4. Effective Citizenship: Demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.

5. Ethics: Recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.

6. Environment and Sustainability: Understand the issues of environmental contexts and sustainable development.

7. Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes.

#### **Employability Potential of the Programme:**

"Statistics is a term which relates to the study of the analysis, collection, presentation and organization of numerical data. Statistics can interpret aggregates of data which are too large to be understood by ordinary observation".

Professionals, who use statistics to design, collect and interpret data in different fields of industry called **"Statisticians".** 

After studying and completing this course students are able to understand various job titles available in the field of Statistics and can use statistics in various fields such as business, industry, agriculture, government, private, computer science,

Scientific, health sciences and other disciplines. In an increasingly data-driven world, being able to translate information into meaningful insights that can be used by companies and organizations is a valuable skill for the following job titles;

Statistician Econometrician Research Analyst Biostatistician Biometrician Epidemiologist Data Scientist Sport Statistician Medical Statistician Statistical Investigator Statistical Quality Controller Market Researcher And the job areas are; Census, Ecological, Medical, Election, Crime, Education, Film, Cricket, Tourism, etc. Duties of Statistics are listed below;

- ٠
- Collecting and analysing the data. To design experiments or surveys to collect the required data. •
- Applying statistical methods to solve practical problems in business, science and other fields. •
- Writing reports and articles of their analysis. •
- Presenting results to clients or authorities. •

### Part B

### Syllabus Prescribed for First Year UG Programme

### Programme: BA (Statistics) Course/ Subject : Statistics

### Semester 1

Code of the Course/Subject	Title of the Course/Subject	(Total Number of Periods)
1121	Statistics S1 Basic Statistics	5 period per week

### Cos

### After completing this course students will be able to

1. Students developed with basic knowledge about Statistics and its scope in various fields.

- 2. Become familiar with handling of data.
- 3. Can express the vast and diverse data into compact and more specific manner
- 4. Enable to estimate the trends in vital events like births and deaths

5 Understand the working of federal and private Statistical office local to their residence.

Unit	Content	
Unit I	Introduction to Statistics	12
	1.1 Meaning, origin and definition of Statistics	periods
	1.2 Importance and Scope of Statistics in planning,	
	economics,	
	Agriculture, medical science and education, limitation of	
	Statistics.	
	1.3 Types of data: Quantitative, qualitative, nominal, ordinal,	
	discrete, continuous, Time series, frequency and non-	
	frequency, population and Sample.	
	1.4 Primary and secondary data and its major sources.	
Unit II	Presentation of data	12
	2.1 Classification : Definition, Rules, Types and Importance	periods
	2.2Tabulation: Definition, Types parts and advantages.	
	2.3 Graphical representation: Rules, Types and importance of	
	histogram,	
	frequency polygon, frequency curve.	
	2.4 Diagrammatic representation: Line diagram, Bar diagram,	
	Pie Diagram, Pictograms and Cartograms.	
	2.5 Rules, advantages and disadvantages of diagrammatic	
	representation.	

Unit III	<ul> <li>Frequency distribution and central tendency</li> <li>3.1 Discrete and Continuous Frequency Distribution</li> <li>3.2 Class, Class limits, Class interval, Types of classes</li> <li>3.3 Central Tendency: Concept, definition and measures</li> <li>3.4 Characteristics of ideal measure, merit, demerits and uses of arithmetic mean, median and mode</li> <li>3.5 Partition values: quartile, deciles and percentiles</li> </ul>	12 periods
Unit IV	<ul> <li>Indian Applied Statistical System</li> <li>4.1 Statistical Organisation in India and their functions: CSO, NSSO, ISI and IIPS.</li> <li>4.2 Method of collection of official Statistics</li> <li>4.3 De-jure and De-Facto method of census, its merits and demerits.</li> <li>4.4 Population Statistics, Agriculture Statistics and their publications.</li> <li>4.5 Principal publication of Industrial, Transportation and Educational Statistics.</li> </ul>	12 periods

# Programme: BA (Statistics) Course/ Subject : Statistics

Semester 1

Code of the Course/Subject	Title of the Course/Subject	(No. of Periods/Week)
	(Laboratory/Practical/practicum/hands- on/Activity)	
1121	Statistics S1-Lab	4 Periods per week

## Cos

## By the end of the Lab/Practical Course, generally students should be able to:

- 1. Represent collected data with the help of graphs and diagram.
- 2. Calculate various measures of central tendencies.
- 3. Present the data in frequency table.
- 4. Analyze the demographic data using death rate

## \* List of Practical/Laboratory Experiments/Activities etc.

1	Presentation of data by frequency table
2	Graphical representation of numerical data
3	Diagrammatic representation of numerical data
4	Calculation of arithmetic mean for grouped and ungrouped frequency distribution
5	Calculation of median for grouped and ungrouped frequency distribution
6	Calculation mode for grouped and ungrouped frequency distribution
7	Calculation of partition value: quartile, deciles and percentiles
8	Computation crude death rate
9	Computation of specific death rate
10	Computation of standardised death rate by direct and indirect method

# Programme: BA (Statistics) Course/ Subject : Statistics

Semester II

Code of the Course/Subject	Title of the Course/Subject	(Total Number of Periods)
1121	Statistics S2;Probability and Descriptive Statistics	5 period per week

### Cos

# After completing this course students will be able to

- 1. Probabilistic knowledge of students would be developed.
- 2. Compare the data in terms of variability.
- 3. Enable to measure the seasonal effects and trends in economics
- 4. Enable to determine premium while obtaining the life insurance policy
- 5. Students are able to distinguish between primary and secondary data

Unit	Content	
Unit I	Dispersion and moments	12
	<ol> <li>Meaning, definition, measures, characteristics of ideal measure ofdispersion.</li> <li>Range, quartile deviation, mean deviation, standard deviation and variance.</li> <li>Coefficient of dispersion, coefficient of variation, andits uses.</li> <li>Moments: Definition of raw and central moments, relation between them.</li> </ol>	periods
Unit II	Skewness and Kurtosis	12 periods
	2.1 Skewness, meaning and types, positive and negative	perious
	skewness with diagram.	
	2.2 Measures of skewness, absolute and relative measures,	
	coefficient of skewness- Karl Pearson's, Bowley's and	
	based on moments.	
	2.3 Kurtosis: Meaning and types with diagram.	
	2.4 Measures of Kurtosis.	
Unit III	Theory of probability	12
	3.1 Basic terminology : Random experiment, outcome, trial,	periods
	event, exhaustive, favourable, mutually exclusive, equally	
	likely, independent events. Sample space and sample	
	points,	
	3.2 Probability : Concept, mathematical probability, its	
	limitations, Statistical probability, its limitations.	
	3.3 Axioms of probability, addition theorem of probability	
	(only statement)	
	3.4 Simple problems on probability	

11.4 117	Fertility and Life Table	12
Unit IV	4.1 Fertility : Meaning and measures of fertility, crude birth	periods
	rate, its merits and demerits	
	4.2 Population growth, its measurement, crude birth rate of	
	natural increase and Pearl's vital index, merits and	
	demerits.	
	4.3 Life Table: Meaning, various components of life table,	
	simple theorems.	
	4.4 Expectation of life, curate and complete expectation,	
	stationary and stable population.	
	4.5 Assumption, description and construction of life table,	
	uses of life table.	
Unit V	Time Series Analysis	12
	5.1 Meaning, Definition with examples of time series, time	periods
	series as function of various factors and examples.	
	5.2 Components of time series, trend, linear and non-linear,	
	periodic changes, seasonal and cyclic, irregular	
	components.	
	5.3 Analysis of time series, mathematical model and	
	limitations, uses of time series.	
	5.4 Measurement of trend: Graphical method, method of	
	semi-averages, method of moving averages, method of	
	least square.	
*SEM	Collection of data	15
	1) Identify population and sample	periods
	2) Collection of data using complete enumeration and sample survey	
	method and secondary data source.	
	3) Classification and tabulation of data.	
	4) Pictorial and graphical representation of data.	
	5) Simple and weighted average of data.	
	6) Interpretation	
COs:		
	At the end of this SEM students would be able to	
	1. Apply various techniques of collection of data	
	2. Prepare of questionnaire for various studies.	
	3. Distinguish between primary and secondary data.	
	4. Make use of Statistical tool (Excel, SPSS)	

**Activities	1.Study of students drop out from first year to second year with reference
	to girls, boys and both
	2.Prepare tabular representation of employees of institute according age
	group, hence find average age of the employees.
	3.Compare the average marks of students in XII standard admitted in first
	year in Arts, Commerce & Science.
	4.Comparative study of passing percentage of final year students in Arts,
	Commerce & Science.
	5. Arranges quiz to access the subject knowledge level.
	6. Arranges group discussion to become familiar with topic and
	terminology.

### **Course Material/Learning Resources**

Text books:

- 1) मुलभूत सांख्यिंकी प्रा. राम देशमुख विद्याप्रकाशन
- 2) संख्यात्मक तंत्रे प्रा. राम देशमुख विद्दयाप्रकाशन
- 3) सांख्यिंकी मुलभूत तंत्रे : प्रा. पुरूषोत्तम नवघरे

## **Reference Books:**

- 1) Bhat B.R. Shrivenkataraman T and Rao Madhava K.S. (1996) : Statistics: A Beginners's Text Vol.1, New Age International (P) Ltd.
- 2) Goon A.M., Guptam M.K., Dasgupta B: Fundamental of Statistics, Vol 1, 2, World Press Calcutta.
- 3) Croxton F.E., Cowden D.J.andKelin S: Applied Generatl Statistics, Prentice Hall India
- 4) Gupta S.C., Kapoor V.K. : Fundamental of Mathematical Statistics; S. Chand & Company

# Programme: BA (Statistics) Course/ Subject : Statistics

Semester II

Code of the Course/Subject	Title of the Course/Subject	(No. of Periods/Week)
	(Laboratory/Practical/practicum/hands- on/Activity)	
1121	Statistics S2-Lab	4 Periods <b>per week</b>

Cos

### By the end of the Lab/Practical Course, generally students should be able to:

1. Students developed with the basic knowledge about Statistics and able to obtain data from

various field.

- 2. Becomes familiar with handling of data and can present in summary format
- 3. Student can express the vast and diverse data into compact and more specific use.
- 4. Students are able to estimates trend value in vital events like births and deaths.
- Understand the working of Statistical organisation like State District Statistical office, State Economic and Statistics office, CSO, NSSO and obtain relevant data as per requirement.

## \* List of Practical/Laboratory Experiments/Activities etc.

1	Calculation of measures of dispersion, range, quartile deviation, mean deviation and standard deviation.
2	Calculation of coefficient of variation.
3	Calculation of skewness and kurtosis.
4	Evaluation of probabilities- simple problems
5	Evaluation of probabilities using addition and multiplication theorem.
6	Calculation of crude birth rate.
7	Calculation of general fertility rate.
8	Calculation of total fertility rate
9	Calculation of life table.
10	Measurement of linear trend by graphical method, method of semi averages and method of moving averages.