



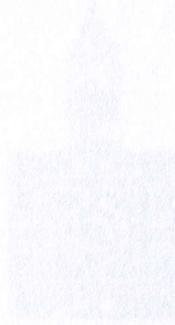
ಅಗು ನಲ ಅನಿಶೇತನ  
BE BOUNDLESS

# **BENGALURU CITY UNIVERSITY**

## **SYLLABUS For B.Sc STATISTICS (I & II Semester)**

**CHOICE BASED CREDIT SYSTEM**

**2020-2021**



BENGALURU CITY UNIVERSITY

BENGALURU CITY UNIVERSITY

SYLLABUS for B.A. STATISTICS  
(I & II Semesters)

CHOICE BASED CREDIT SYSTEM

2020-2021

**BENGALURU CENTRAL UNIVERSITY  
BOARD OF STUDIES IN STATISTICS**

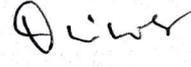
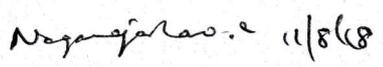
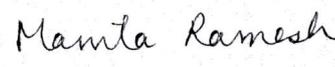
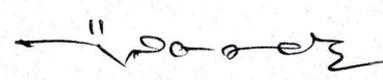
Date: 11-08-2018

Proceedings of the meeting of the Board of Studies in Statistics (UG & PG) held at 11:00 am on 11-08-2018 in board room of Canara Bank School of Management, Central College campus.

The meeting started by welcoming the members by the Chairperson of the board of studies. The following decisions were taken.

1. The members discussed and approved the syllabus for I and II semesters of UG optional Statistics. Also, it is decided to finalise the syllabus for other semesters in the next BOS meeting.
2. The panel of examiners for BSc examinations for the year 2018-19 was approved.
3. It was ratified that all the UG colleges have been instructed to follow the Bangalore University UG syllabus only for the academic year 2018-19.

Members Present:

1. Prof. G. Nanjundan 
2. Dr. V. Srinivas 
3. Dr. Nagaraja Rao Chillale 
4. Dr. Lakshmi, S. K. 
5. Smt. Mamta Ramesh 
6. Smt. Acharya Deepa Raghuram 
7. Prof. Parameshwar V. Pandit (Chairperson) 

BENGALURU CENTRAL UNIVERSITY  
BOARD OF STUDIES IN STATISTICS

Date: 11-08-2018

Proceedings of the meeting of the Board of Studies in Statistics (U & PG) held at 11:00 am on 11-08-2018 in board room of Canga Park School of Management Central College campus

The meeting started by welcoming the members by the Chairperson of the board of studies. The following decisions were taken.

1. The members discussed and approved the syllabus for I and II semesters of UG optional statistics. Also it is decided to finalize the syllabus for other semesters in the next BOS meeting.
2. The panel of examiners for BSc examination for the year 2018-19 was approved.
3. It was decided that all the UG students have been advised to follow the Bangalore University UG syllabus only for the academic year 2018-19.

Members Present:

1. Prof. Dr. N. Rajendran
2. Dr. V. Srinivas
3. Dr. Srinivas Rao Chittala
4. Dr. Srinivas S.K.
5. Dr. Srinivas Kamlesh
6. Dr. Srinivas Deepa Raju
7. Dr. Srinivas V. Raju

# BENGALURU CENTRAL UNIVERSITY

## Regulations and Syllabus for STATISTICS in Three Year BSc Course (2020)

### Eligibility

1. Only those candidates who have passed Pre-University course or an equivalent course with Mathematics/Business Mathematics/ Basic Mathematics/Applied Mathematics as one of the optional subjects are eligible to take Statistics as one of the optional subjects in BSc course.
2. Any student taking Statistics as one of the optional subjects in the B.Sc. course shall take Mathematics as another optional subject.

### Scheme of Instruction/ Examination

1. The subject of Statistics in this course has to be taught by MSc/MA degree holders in Statistics / Applied Statistics.
2. The theory question paper for each paper shall cover all the topics in the pertaining syllabus with proportional weightage to the number of hours of instruction prescribed.
3. The practicals are to be conducted in batches as per the University norms for the faculty of science (normally 10 students per batch per teacher).
4. Two teachers are to be assigned for each batch with not more than 20 students for giving instructions, supervision, and correction of records.
6. It is expected that each student collects and uses real life data for the practical classes.
7. Students are required to use Statistical software, run the programmes, and enclose computer outputs to the practical records in the case of computer based practicals.
8. Maximum marks for each record in the examination is 5.
9. Study tour for the students is strongly recommended to gain practical knowledge of applications of Statistics in Industries/Agriculture/Medical field.

**Scheme for theory and practicals**

Sem.	Code number	Title of the paper (Theory / Practical)	Lecture/ Practical hours per week	Duration of exam	IA marks	Maximum marks	Total	Credits
I	ST 101	Basic Statistics-I	04	03	30	70	100	2
	ST 102	Practical –I	03	03	15	35	50	1
II	ST 201	Basic Statistics- II	04	03	30	70	100	2
	ST 202	Practical –II	03	03	15	35	50	1
III	ST 301	Statistical Inference-I	04	03	30	70	100	2
	ST 302	Practical –III	03	03	15	35	50	1
IV	ST401	Statistical Inference-II	04	03	30	70	100	2
	ST 402	Practical –IV	03	03	15	35	50	1
V	ST 501	Sampling Theory and Statistical Quality Control	03	03	30	70	100	2
	ST502	Practical –V	03	03	15	35	50	1
V	ST 503	Design and Analysis of Experiments	03	03	30	70	100	2
	ST504	Practical –VI	03	03	15	35	50	1
VI	ST 601	Applied Statistics	03	03	30	70	100	2
	ST602	Practical –VII	03	03	15	35	50	1
VI	ST 603	Operations Research	03	03	30	70	100	2
	ST604	Practical –VIII	03	03	15	35	50	1

**Total credits: 24**

# STATISTICS

## FIRST SEMESTER

4 hours lecture + 3 hours practical per week  
(Theory 2 credits + Practical 1 credit)

### ST 101: BASIC STATISTICS – I

(52 hours : 2 credits)

#### *Unit 1*

**Organization and presentation of data:** Meaning, importance, and scope of Statistics. Types of data: Primary and secondary data. Types of measurements: Nominal, ordinal, ratio, and interval. Classification and tabulation. Construction of frequency distribution. Graphical representation: Frequency curve, Ogives, histogram. **8 hrs**

#### *Unit 2*

**Measures of location:** Arithmetic mean, median, mode, geometric mean, harmonic mean and their properties. Quantiles: quartiles, deciles, percentiles. **7 hrs**

#### *Unit 3*

**Measures of Dispersion:** Absolute and relative measures of dispersion: range, standard deviation, mean deviation, quartile deviation, coefficient of variation and their properties. Moments: Raw and central moments, their properties and relationship between them. Skewness and kurtosis: concept, measures, and properties. **12 hrs**

#### *Unit 4*

**Bivariate data analysis:** Bivariate data, Scatter diagram, Correlation, Karl Pearson's correlation coefficient, Spearman's rank correlation coefficient. Concept of errors, Principle of least squares. Simple linear regression and its properties. Fitting linear regression line and coefficient of determination. **10 hrs**

#### *Unit 5*

**Elements of probability:** Random experiments, sample space, events, related results. Classical, empirical, and axiomatic approaches to probability. Properties of probability. Illustrations and applications. Addition theorem. Conditional probability, independence of events. Law of total probability. Bayes theorem and applications. **15 hrs**

## ST 102: PRACTICAL – I

### List of Assignments

(30 hours : 1 credit)

#### (Demonstration using MS Excel )

1. Construction of frequency distribution and graphical representation.
2. Measures of central tendency I
3. Measures of central tendency II (Positional averages & Partition values).
4. Measures of dispersion (Range, QD, MD, SD, and CV).
5. Moments, skewness, and kurtosis for a frequency distribution.
6. Correlation and regression for ungrouped data and Spearman's rank correlation coefficient.
7. Correlation and regression for grouped data
8. Computation of probabilities using combinatorial methods.
9. Application of addition rule, conditional probability, Bayes formula.

#### Text Books

1. Croxton, F.E, Cowden, D.J., and Klein, S. (1973). *Applied General Statistics*, 3/e, Prentice Hall Inc., New Jersey, USA.
2. Freund, J.E. and Walpole, R.E. (1987). *Mathematical Statistics*, 4/e, Prentice Hall Inc., New Jersey, USA.
3. Goon, A.M., Gupta, M.K., and Das Gupta, B. (1991). *Fundamentals of Statistics, Vol. I*, World Press, Calcutta.
4. Medhi, J. (1992). *Statistical Methods: An introductory Text*, New Age International, New Delhi.
5. Montgomery, D.C. and Runger, G.C. (2013). *Applied Statistics and Probability for Engineers*, Wiley India, New Delhi.

#### References

1. Anderson, T.W. and Sclove, S.L. (1978). *An Introduction to the Statistical Analysis of Data*, Houghton Mifflin and Co, New York.
2. Cooke, H.D., Craven, A.H., and Clarke, G.M. (1982): *Basic Statistical Computing*, Chapman and Hall, New York.
3. Mood, A.M., Graybill, F.A., and Boes, D.C. (1974): *Introduction to the Theory of Statistics*, McGraw Hill, New York.
4. Ross, S.M (2003). *Introduction to Probability Models*, 10/e, Academic Press, UK.
5. Snedecor, G.W. and Cochran, W.G. (1967). *Statistical Methods*, Iowa State University Press, USA.
6. Spiegel, M.R. (1967). *Theory and Problems of Statistics*, Schaum's Publishing Series, London.

# STATISTICS

## SECOND SEMESTER

4 hours lecture +3 hours practical per week  
( Theory 2 credits + Practicals 1 credit)

### ST 201: BASIC STATISTICS – II

(52 hours : 2 Credits)

#### Unit 1

**Random variables and expectation (Univariate):** Distribution function, Discrete and continuous random variables, Probability mass and density functions- properties and illustrations. Expectation of a random variable and algebra of expectations and related results. **9 hrs**

#### Unit 2

**Random variables and expectation (Bivariate):** Bivariate random variables, joint, marginal, and conditional distributions. Independence of random variables. Moments, covariance, and correlation coefficient. Properties of expectations of bivariate random variables. Mean and variance of linear combination of random variables. **7 hrs**

#### Unit 3

Moments and moment generating function, properties and applications. Transformation of random variables. **5 hrs**

#### Unit 4

**Discrete probability distributions:** Discrete uniform, Bernoulli, binomial, Poisson, geometric, negative binomial, and hypergeometric distributions – mean, variance, moments, and MGF. Recursive relations for moments of binomial and Poisson distributions. Approximations of binomial, negative binomial and hyper geometric distributions. **15 hrs**

#### Unit 5

**Continuous probability distributions:** Uniform, gamma, beta, exponential, Normal, and Cauchy distributions – mean, variance, moments, MGF, and properties. **18 hrs**

## ST 202: PRACTICAL –II

### List of Assignments

(30 hours : 1 credit)

#### (Demonstration using MS Excel and R software)

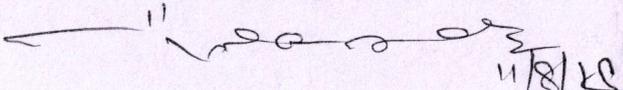
1. Univariate probability distributions –I (Discrete): Expectation, moments
2. Univariate probability distributions –II (Continuous): Expectation, moments.
3. Bivariate probability distributions: Moments and correlation coefficient.
4. Applications of binomial distribution and fitting binomial distribution.
5. Applications of Poisson distribution and its fitting.
6. Computation of probabilities based on negative binomial, geometric, hyper geometric and discrete uniform distributions.
7. Applications of Normal distribution.
8. Fitting normal distribution.
9. Computation of probabilities based on rectangular and exponential distributions.

#### Text Books

1. Goon A.M., Gupta, M.K., Das Gupta, B. (1991). *Fundamentals of Statistics*, Vol.I, World Press, Calcutta.
2. Hogg, R. V. and Craig, A.T. (1995). *Introduction to Mathematical Statistics*, 5/e, Prentice Hall, New Jersey, USA.
3. Medhi, J. (1992). *Statistical Methods: An introductory text*, New Age International, New Delhi.
4. Mukhopadhyay, P.(2015): *Mathematical Statistics*, Books and Allied Pvt Ltd., Kolkata.
5. Spiegel, M.R. (2001). *Probability and Statistics*, 4/e, Schaum's Outline Series, McGraw Hill, London.
6. Walpole, R.E., Myers, R.H., and Myers, S.L. (2017). *Probability and Statistics for Engineers and Scientists*, 9/e, Pearson, New Delhi.

#### References

1. Bhattacharya, G. K. and Johnson, R.A. (1986): *Statistical Concepts and Methods*, John Wiley, New York.
2. Dudewicz, E.J. and Mishra, S.N.(1980). *Modern Mathematical Statistics*, John Wiley, New York.
3. Montgomery, D.C. and Runger, G.C. (2013). *Applied Statistics and Probability for Engineers*, Wiley India, New Delhi.
4. Rohatgi, V.K. and Saleh, A.K. Md. E. (2002). *An Introduction to Probability Theory and Mathematical Statistics*, 3/e, John Wiley, New York.
5. Ross, S.M (2003). *Introduction to Probability Models*, 10/e, Academic Press, UK.

  
Chaitan  
BOS in Statistics