

**FACULTY OF SCIENCES**

**SYLLABUS FOR THE BATCH FROM THE YEAR 2024 TO YEAR 2025**

**Programme Code: DST**

**Programme Name: Diploma in Statistical Techniques and Data Analysis**

**(Semester I-II)**

**Examinations: 2024-2025**



**P.G. Department of Mathematics**

**Khalsa College, Amritsar**

- 
- Note:** (a) Copy rights are reserved. Nobody is allowed to print it in any form.  
(b) Subject to change in the syllabi at any time.  
(c) Please visit the College website time to time.

Chairperson, BOS in Mathematics

SYLLABUS FOR THE BATCH FROM THE YEAR 2024 TO YEAR 2027

S.No.	PROGRAMME OBJECTIVES
1.	To enhance problem solving skills and develop logical thinking in statistics.
2.	To exhibit proficiency in application of statistics to solve daily life problems.

S.No.	PROGRAMME SPECIFIC OUTCOMES (PSOS)
PSO-1	understand basic principles of statistics .
PSO-2	demonstrate technical and technological skills based on Statistical methods to meet the growing demand in the industrial, marketing, communication sectors

Chairperson, BOS in Mathematics

SYLLABUS FOR THE BATCH FROM THE YEAR 2024 TO YEAR 2027

COURSE SCHEME											
SEMESTER - I											
Course Code	Course Name	Hours/Week	Credits			Total Credits	Max Marks				Page No.
			L	T	P		Th	P	IA	Total	
<b>Major Courses</b>											
DST-111A	Data Interpretation	6	3	0	0	3	45	-	15	60	4-5
DST-111B	Probability Theory	6	3	0	0	3	45	-	15	60	6-7
DST-111P	Practicals based on the paper Data Interpretation	6	0	0	2	2	-	60	20	80	8
Total						8	150		50	200	

COURSE SCHEME											
SEMESTER - II											
Course Code	Course Name	Hours/Week	Credits			Total Credits	Max Marks				Page No.
			L	T	P		Th	P	IA	Total	
<b>Major Courses</b>											
DST-121A	Descriptive Statistics-I	6	3	0	0	3	45	-	15	60	9-10
DST-121A	Descriptive Statistics-II	6	3	0	0	3	45	-	15	60	11-12
DST-121P	Practicals based on the paper Descriptive Statistics-II	6	0	0	2	2		60	20	80	13
Total						8	150		50	200	

Chairperson, BOS in Mathematics

# Khalsa College, Amritsar

(An Autonomous College)

## Syllabus for

**PROGRAMME: Diploma in Statistical Techniques and Data Analysis**

SEMESTER-I

COURSE CODE: **DST-111A**

COURSE TITLE: **Data Interpretation**

L	T	P	Credits
3	0	0	3

Time: 3 Hours

Max. Marks: 60

Theory Marks: 45

Theory Internal Assessment Marks: 15

### Instructions:

1. Section A will have total of 8 questions (2 questions from each unit), out of which student has to attempt any five. Each question carries 1 mark.
2. Section B, C, D and E each will consist of two questions from units I, II, III, IV respectively. Student has to attempt one question from each unit. Each question carries 10 marks.
3. Teaching time for this paper would be Six periods per week.
4. Non-programmable and non-scientific simple calculator is allowed.

### Course Objectives:

- Students will be able to solve statistical problems using measures of central tendency.
- Students will learn about diagrammatic representation of data.
- Students will have the idea of data analysis.

### Course content:

#### Unit-I

Data: Primary data, secondary data, Organization of data, Representation of data (Frequency distribution Table, Bar graph, Histogram, Frequency polygon, Pie chart).

#### Unit-II

Measures of Central Tendency: Arithmetic mean, median, mode (simple problems), Simple problems based on combined mean and corrected mean.

#### Unit-III

Measures of Dispersion: Range, quartile deviation. Mean deviation (Simple problems), Standard deviation (Simple problems).

#### Unit-IV

Skewness: Positive and negative skewness, Karl-Pearson's coefficient of skewness (Simple problems).

Chairperson, BOS in Mathematics

**Books recommended:**

1. Robert V. Hogg, Joseph W. McKean and Allen T. Craig, Introduction to Mathematical Statistics, Pearson Education, Asia, 2007.
2. Irwin Miller and Marylees Miller, John E. Freund, Mathematical Statistics with Applications, 7<sup>th</sup> Ed., Pearson Education, Asia, 2006.
3. Gupta, S.C. and Kapoor, V.K.: Fundamentals of Mathematical Statistics, Sultan Chand and Company, 2007.
4. Gupta, S.C.: Statistical Methods, Himalayan Publishing House, 2003.

**Course Outcomes:** After completing the course the students will be able to

- Collect and analyze the data.
- To apply various measures in solving problems related to finance, accounting and business.
- To formulate the statistical problems.

Chairperson, BOS in Mathematics

# Khalsa College, Amritsar

(An Autonomous College)

## Syllabus for

### PROGRAMME: Diploma in Statistical Techniques and Data Analysis

#### SEMESTER-I

COURSE CODE: DST-111B

COURSE TITLE: Probability Theory

L	T	P	Credits
3	0	0	3

Time: 3 Hours

Max. Marks: 60

Theory Marks: 45

Theory Internal Assessment Marks: 15

#### Instructions:

1. Section A will have total of 8 questions (2 questions from each unit), out of which student has to attempt any five. Each question carries 1 mark.
2. Section B, C, D and E each will consist of two questions from units I, II, III, IV respectively. Student has to attempt one question from each unit. Each question carries 10 marks.
3. Teaching time for this paper would be Six periods per week.
4. Non-programmable and non-scientific simple calculator is allowed.

#### Course Objectives:

- Students will be able to have idea about correlation.
- Students will learn about the probability techniques.
- Students will be familiar about the random variable.

#### Course content:

##### Unit-I

Permutations and combinations (Basic problems), Probability: Definition, Random experiment. Sample space, mutually exclusive events, exhaustive events, Addition law of probability, independent events (Simple problems).

##### Unit-II

Random variable, Probability distributions, Mean and Variance of Random variables.

##### Unit-III

Correlation: Definition, Karl pearson's coefficient of correlation, Rank correlation (Simple problems), properties of correlation co-efficient.

##### Unit-IV

Regression- Meaning, Properties, Types, Meaning of Line of Correlation, Difference between correlation and regression, Measurement of Regression equations X on Y and Y on X.

**Books recommended:**

1. Robert V. Hogg, Joseph W. McKean and Allen T. Craig, Introduction to Mathematical Statistics, Pearson Education, Asia, 2007.
2. Irwin Miller and Marylees Miller, John E. Freund, Mathematical Statistics with Applications, 7<sup>th</sup> Ed., Pearson Education, Asia, 2006.
3. Gupta, S.C. and Kapoor, V.K.: Fundamentals of Mathematical Statistics, Sultan Chand and Company, 2007.
4. Gupta, S.C.: Statistical Methods, Himalayan Publishing House, 2003.
5. Sample, population, Null hypothesis, alternate hypothesis, Applications of t-test (Test of significance of Single mean, Test for difference of means) (Simple problems).

**Course Outcomes:**

- Students will be able to use the concept of probability in various aspects.
- Students will learn about the mean and variance of random variables.

# Khalsa College, Amritsar

(An Autonomous College)

## Syllabus for

**PROGRAMME: Diploma in Statistical Techniques and Data Analysis**

## SEMESTER-I

**COURSE CODE: DST-111P**

**COURSE TITLE: Practical based on PAPER: Data Interpretation**

L	T	P	Credits
0	0	2	2

**CREDIT HOURS (PER WEEK): 3**

**TOTAL HOURS: 45 hrs.**

**MAXIMUM MARKS: 80**

**Practical Marks: 60**

**Internal Assessment: 20**

**Time: 2 Hours**

**MEDIUM: English**

### **INSTRUCTIONS FOR PAPER SETTER AND STUDENTS:**

Students are required to prepare a practical note book with at least 30 exercises based upon the list given below. At the end of semester, there is a practical examination jointly conducted by two examiners (one is internal and another one is external). This practical examination will cover a written test followed by a viva-voce to test the practical knowledge of students about the contents. The candidates are allowed to use Non-Programmable scientific calculators. The distribution of marks is as under:-

1. Practical Note book: 15 marks
2. Viva – voce: 15 marks
3. Written Examination: 30 marks

### **COURSE CONTENT:**

Teaching time for practical paper would be two period per week.

#### ***List of practical exercises:***

1. Exercises on presentation of Data
2. Exercises on measures of central tendency
3. Exercises on measures of dispersion
4. Exercises on measures of Skewness

Chairperson, BOS in Mathematics



# Khalsa College, Amritsar

(An Autonomous College)

## Syllabus for

**PROGRAMME: Diploma in Statistical Techniques and Data Analysis**

SEMESTER–II

COURSE CODE: **DST-121A**

COURSE TITLE: **DESCRIPTIVE STATISTICS-I**

L	T	P	Credits
3	0	0	3

Time: 3 Hours

Max. Marks: 60

Theory Marks: 45

Theory Internal Assessment Marks: 15

### Instructions for the paper setter:

1. Section A will have total of 8 questions (2 questions from each unit), out of which student has to attempt any five. Each question carries 1 mark.
2. Section B, C, D and E each will consist of two questions from units I, II, III, IV respectively. Student has to attempt one question from each unit. Each question carries 10 marks.
3. Teaching time for this paper would be Six periods per week.
4. Non-programmable and non-scientific simple calculator is allowed.

### Course Objectives:

- Students will be able to solve various statistical problems using suitable distribution.
- Students will learn about the Binomial, Poisson and Normal distributions.
- Students will have the idea of index numbers and its uses.

### Course content:

#### Unit-I

Binomial distribution, Poisson distribution, Normal distributions (Simple problems).

#### Unit-II

Sample, Population, Characteristics of good sample, type of sampling techniques, Sampling errors.

#### Unit-III

Index Numbers: Meaning and Uses and Types of Index Numbers, problems in the construction, Methods of Index Numbers: Laspayer's, Paasche and Fisher.

#### Unit-IV

Tests of consistency of Index Number Formulae, Chain index or Chain Base Index Numbers, Base Shifting, Splicing and Deflation. Limitations of Index Numbers.

**Books recommended:**

1. Robert V. Hogg, Joseph W. McKean and Allen T. Craig, Introduction to Mathematical Statistics, Pearson Education, Asia, 2007.
2. Irwin Miller and Marylees Miller, John E. Freund, Mathematical Statistics with Applications, 7<sup>th</sup> Ed., Pearson Education, Asia, 2006.
3. Gupta, S.C. and Kapoor, V.K.: Fundamentals of Mathematical Statistics, Sultan Chand and Company, 2007.
4. Gupta, S.C.: Statistical Methods, Himalayan Publishing House, 2003.

**Course Objectives:**

- Students will be able to solve statistical problems using various distributions.
- Students will learn the concept of index numbers.
- Students will have the idea of various distributions.

Chairperson, BOS in Mathematics

## Khalsa College, Amritsar

(An Autonomous College)

### Syllabus for

### PROGRAMME: Diploma in Statistical Techniques and Data Analysis

#### SEMESTER-II

**COURSE CODE: DST-121B**

**COURSE TITLE: DESCRIPTIVE STATISTICS-II**

L	T	P	Credits
3	0	0	3

Time: 3 Hours

Max. Marks: 60

Theory Marks: 45

Theory Internal Assessment Marks: 15

#### Instructions:

1. Section A will have total of 8 questions (2 questions from each unit), out of which student has to attempt any five. Each question carries 1 mark.
2. Section B, C, D and E each will consist of two questions from units I, II, III, IV respectively. Student has to attempt one question from each unit. Each question carries 10 marks.
3. Teaching time for this paper would be Six periods per week.
4. Non-programmable and non-scientific simple calculator is allowed.

#### Course Objectives:

- Students will be able to use various tests to solve different statistical problems
- Students will learn to about the population and various types of samples.
- Students will have the idea to compare various datas.

#### Course content:

##### Unit-I

Meaning of Hypothesis, Characteristics of Hypothesis, Basic Concepts: Null Hypothesis and Alternative Hypothesis, One-tailed and Two-tailed, Type-I and Type-II errors, Level of Significance. Power of a test. (Simple Problems)

##### Unit-II

Hypothesis Testing Procedures. Large sample test, Z-test: Test of significance of single mean, Test of significance of difference of means (Simple problems).

##### Unit-III

**t-test:** Test of significance of single mean, Test of significance of difference of means, Paired t-test of difference of means (Simple problems).

##### Unit-IV

Chi-square test: as test of hypothesis, test of equality or homogeneity.

Chairperson, BOS in Mathematics

**Books recommended:**

1. Robert V. Hogg, Joseph W. McKean and Allen T. Craig, Introduction to Mathematical Statistics, Pearson Education, Asia, 2007.
2. Irwin Miller and Marylees Miller, John E. Freund, Mathematical Statistics with Applications, 7<sup>th</sup> Ed., Pearson Education, Asia, 2006.
3. Gupta, S.C. and Kapoor, V.K.: Fundamentals of Mathematical Statistics, Sultan Chand and Company, 2007.

**Course Objectives:**

- Students will be able to compare two populations.
- Students will learn about the applications of t-test, F-test and Chi-square test.
- Students will have the idea of Type-I and Type-II errors.

Chairperson, BOS in Mathematics

**Khalsa College, Amritsar**

(An Autonomous College)

**Syllabus for****PROGRAMME: Diploma in Statistical Techniques and Data Analysis****SEMESTER-II****COURSE CODE: DST-121P****COURSE TITLE: Practical based on PAPERS: Descriptive Statistics-II**

L	T	P	Credits
0	0	2	2

**CREDIT HOURS (PER WEEK): 3****TOTAL HOURS: 45 hrs.****MAXIMUM MARKS: 80****Practical Marks: 60****Internal Assessment: 20****Time: 2 Hours****MEDIUM: English****INSTRUCTIONS FOR PAPER SETTER AND STUDENTS:**

Students are required to prepare a practical note book with at least 30 exercises based upon the above list. At the end of semester, there is a practical examination jointly conducted by two examiners (one is internal and another one is external). This practical examination will cover a written test followed by a viva-voce to test the practical knowledge of students about the contents. The candidates are allowed to use Non-Programmable scientific calculators. The distribution of marks is as under:-

1. Practical Note book: 15 marks
2. Viva – voce: 15 marks
3. Written Examination: 30 marks

**COURSE CONTENT:**

Teaching time for practical paper would be two period per week.

***List of practical exercises:***

- 1.Exercises on t-test
- 2.Exercises on Z-Test
- 3.Exercises on chi-square test
- 4.Exercises on testing of hypothesis

Chairperson, BOS in Mathematics