



Sir P. T. Sarvajani College of Science (Autonomous)
Surat-395001
(Affiliated with Veer Narmad South Gujarat University, Surat)



SYLLABUS
FOR
B. Sc. Sem. I & II
Program: B. Sc.
Course: Mathematics

From
Academic year
2025-26



Graduate Attributes

After the successful completion of modules in different courses of B.Sc. MATHEMATICS, the learner will be able to:

GA 1: Apply concepts of Mathematics and acquired skill sets to unknown problems in order to establish an effective approach or strategy for dealing with them.

GA 2: Explore and derive quantitative data in the realms of Mathematics.

GA 3: Develop analytical and observation skills through different examples.

GA 4: Approach any real-life problem with proper assumption, logic and constraints.

GA 5: Prepare for jobs, career development, and lifelong learning in Mathematics, by using acquired ICT skills and mathematical skills.

Programme Specific Outcomes

PSO - 1 Derive a solution by the use of Definition.

PSO - 2 Use of theorems to solve problems under the given scenario.

PSO - 3 For the solution of Difficult examples usage of abstract knowledge.

PSO - 4 Generalise results for a general set up.

PSO - 5 For problem solving generation of ideas.

PSO - 6 create meritorious students by gained knowledge.



Content

Sr. No	Semester	Course Name	Course Code	Course title
1	I	Major I	MHMJ-S1P1-3CR25	Introduction to Functions of Complex Quantities
2		Major II	MHMJ-S1P2-3CR25	Differential Calculus
3		Minor I	MHMN-S1P1-2CR25	Differential Calculus and Complex Variables
4			STMN-S1P1-2CR25	Descriptive Statistics
5		MDC I	MHMDC-S1P1-4CR25	Elementary Calculus
6			MHMDC-S1P2-4CR25	Fundamentals of Mathematics
7			MHMDC-S1P3-4CR25	Descriptive Statistics-I
8		SEC I	MHSEC-S1P1-2CR25	Fundamentals of Vedic Mathematics- I
9			MHSEC-S1P2-2CR25	Coordinate Geometry- I
10			MHSEC-S1P3-2CR25	Basic Mathematics-I
11		Practical I	MHMJ-S1PR1-1CR24	Lab Course-I (Major-P1)
12			MHMJ-S1PR2-1CR24	Lab Course-II (Major-P2)
13			MHMN-S1PR1-2CR24	Lab Course-I (Minor Math)
14			STMN-S1PR1-2CR24	Lab Course-I (Minor Stat)
1	II	Major III	MHMJ-S2P3-3CR24	Matrix Theory
2		Major IV	MHMJ-S2P4-3CR24	Integral Calculus & ODE
3		Minor II	MHMN-S2P2-2CR24	Integral Calculus and Matrices
4			STMN-S2P2-2CR24	Correlation and Regression
5		MDC II	MHMDC-S2P1-4CR24	Matrices and Determinants
6			MHMDC-S2P2-4CR24	Ordinary Differential Equations
7			MHMDC-S2P3-4CR24	Descriptive Statistics-II
8		SEC II	MHSEC-S2P1-2CR24	Fundamentals of Vedic Mathematics- II
9			MHSEC-S2P2-2CR24	Coordinate Geometry- II
10			MHSEC-S2P3-2CR24	Basic Mathematics-II
11		Practical II	MHMJ-S2PR3-1CR24	Lab Course-III (Major-P3)
12			MHMJ-S2PR4-1CR24	Lab Course-IV (Major-P4)
13			MHMN-S2PR2-2CR24	Lab Course-II (Minor Math)
14			STMN-S2PR2-2CR24	Lab Course-II (Minor Stat)



Detailed Syllabus

B. Sc. Mathematics

(With effect from the Academic year 2024-25)

Course No.	Course Title	Course Code	Credits	Hours	Module	Lectures per module (1 Hr)	Examination		
							Internal Marks	External Marks	Total Marks
SEMESTER I									
Major Courses THEORY									
I	Introduction to Functions of Complex Quantities	MHMJ-S1P1-3CR25	3	45	3	15	37	38	75
II	Differential calculus	MHMJ-S1P2-3CR25	3	45	3	15	37	38	75
Minor Course THEORY									
I	Differential Calculus and Complex Variables	MHMN-S1P1-2CR25	2	30	2	15	25	25	50
I	Descriptive Statistics	STMN-S1P1-2CR25	2	30	2	15	25	25	50
Multidisciplinary Courses									
I	Elementary Calculus	MHMDC-S1P1-4CR25	4	60	4	15	50	50	100
II	Fundamentals of Mathematics	MHMDC-S1P2-4CR25	4	60	4	15	50	50	100
III	Descriptive Statistics-I	MHMDC-S1P3-4CR25	4	60	4	15	50	50	100
Skill Enhance Course (SEC)									
I	Fundamentals of Vedic Mathematics- I	MHSEC-S1P1-2CR24	2	60	-	-	25	25	50
II	Coordinate Geometry- I	MHSEC-S1P2-2CR24	2	60	-	-	25	25	50
III	Basic Mathematics-I	MHSEC-S1P3-2CR24	2	60	-	-	25	25	50
Major Courses Practical									
I	Lab Course-I	MHMJ-S1PR1-1CR24	1	30	-	-	12	13	25
II	Lab Course-I	MHMJ-S1PR2-1CR24	1	30	-	-	12	13	25
Minor Courses Practical									
I	Minor Lab Course-I	MHMN-S1PR1-2CR24	2	60	-	-	25	25	50
I	Minor Lab Course-I	STMN-S1PR1-2CR24	2	60	-	-	25	25	50



SEMESTER II

Major courses THEORY

I	Matrix Theory	MHMJ-S2P3-3CR24	3	45	3	15	37	38	75
II	Integral Calculus & ODE	MHMJ-S2P4-3CR24	3	45	3	15	37	38	75

Minor Course THEORY

I	Integral Calculus and Matrices	MHMN-S2P2-2CR24	4	60	4	15	25	25	50
I	Correlation and Regression	STMN-S2P2-2CR24	2	30	2	15	25	25	50

Multidisciplinary Courses

I	Matrices and Determinants	MHMDC-S2P1-4CR24	4	60	4	15	50	50	100
II	Ordinary Differential Equations	MHMDC-S2P2-4CR24	4	60	4	15	50	50	100
III	Descriptive Statistics-II	MHMDC-S2P3-4CR24	4	60	4	15	50	50	100

Skill Enhance Course (SEC)

I	Fundamentals of Vedic Mathematics- II	MHSEC-S2P1-2CR24	2	60	-	-	25	25	50
II	Coordinate Geometry- II	MHSEC-S2P2-2CR24	2	60	-	-	25	25	50
III	Basic Mathematics-II	MHSEC-S2P3-2CR24	2	60	-	-	25	25	50

Major Courses Practical

I	Lab Course-III	MHMJ-S2PR3-1CR24	1	30	-	-	12	13	25
II	Lab Course-IV	MHMJ-S2PR4-1CR24	1	30	-	-	12	13	25

Minor Courses Practical

I	Minor Lab Course-II	MHMN-S2PR2-2CR24	2	60	-	-	25	25	50
I	Minor Lab Course-II	STMN-S2PR2-2CR24	2	60	-	-	25	25	50



F.Y.B.Sc. (Mathematics) SEMESTER I

Minor Course- I

COURSE TITLE: Descriptive Statistics

COURSE CODE: STMN-S1P1-2CR25 [CREDITS - 02]

Course learning outcome		
At the end of this course, Students will be able to		
1. Understand the concept of data. 2. Demonstrate an understanding of the fundamental Concepts of Descriptive statistics, including measures of Central tendency and measures of Dispersion. 3. Summarize and organize Data effectively using appropriate descriptive statistics techniques. 4. Interpret and analyze data sets accurately. 5. Apply the appropriate descriptive statistics techniques for different types of data, Such as discrete variable & continuous variables. 6. Calculate and interpret various partition values. 7. Apply critical thinking and problem-Solving skills to datasets, effectively utilizing descriptive Statistics techniques to draw meaningful conclusions.		
Module 1	Measures of Central Tendency	[10L]
Learning Objective		
1. To provide introduction of the theories of statistics & application of statistics. 2. To provide details & computations of different measures of Central tendency. 3. Learn to compute different Averages.		
Learning Outcomes:		
At the end of this module the learner will be able to		
1. Recognize, describe, and calculate the measures of the central tendency of data: mean, median, mode, Geometric mean and Harmonic mean. 2. Recognize, describe, and calculate the measures of location of data: quartiles, deciles and percentiles. 3. Students knowing Merits, Demerits and uses of the Measures of Central tendency.		
1.1	• Concept of data • Types of data: Quantitative data and Qualitative data, Discrete data and continuous data • Types of scales: Nominal, Ordinal, Interval and Ratio	[1L]
1.2	• Concept about Measure of Central tendency	[2L]



	- Measures of Central tendency: Mean {Arithmetic Mean (AM), Geometric Mean (GM), Harmonic mean (HM)}, Weighted mean Combined mean. - Relations between A.M, G.M & H.M - Merits, demerits and uses of the above measures of central tendency	
1.3	- Median: Definition, Merits, demerits and uses - Mode: Definition, Merits, demerits and uses	[2L]
1.4	Partition values: Quartiles, Deciles & Percentiles	[1L]
1.5	- Characteristics of an ideal measure of central tendency - Limitations of measures of central tendency	[1L]
1.6	Numerical Problems.	[3L]
Module 2	Measures of Dispersion & Moments, Skewness & Kurtosis	[20L]
Learning Objective - To introduce students to the Measures of Dispersion. - Gain knowledge of Relative measure & Absolute Measure. - Comparison of two data set by using - Coefficient of Variations. - Describe the concepts of Moments and skewness; - Explain the different measures of skewness; - Describe the concepts of kurtosis; Explain the different measures of kurtosis; - Explain how skewness and kurtosis describe the shape of a distribution.		
Learning Outcomes: At the end of this module the learner will be able to - Know the limitation of measure of central tendency - Recognize, describe, and calculate the measures of the dispersion of data: standard deviation, mean deviation about mean, quartile deviation and range. - Know the complementary relationship of skewness with measures of central tendency and dispersion in describing a set of data. - Understand 'moments' as a convenient and unifying method for summarizing several descriptive statistical measures		
2.1	- Concept about Measure of Dispersion - Characteristics of the ideal measures of dispersion.	[2L]
2.2	Relative & Absolute measures of dispersion: {Range, Quartile deviation, Mean deviation, Standard Deviation}, Variance, Combined variance & Coefficient of Variation (CV),	[4L]



	• Merits & demerits and uses of the above measures of dispersion	
2.3	Relationship between Quartile deviation, Mean deviation, Standard Deviation	[1L]
2.4	Moments: • Purpose of moments • Raw moments, Central moments, Moments about arbitrary value and relation moments, • Coefficients based on moments (β_1, β_2, γ_1, γ_2) and interpretation of various values of β_1, β_2, γ_1, γ_2.	[3L]
	Skewness: • Meaning of skewness, • Types of skewness, • Methods of determining skewness and the coefficient of skewness: (i) Karl Pearson's coefficient of skewness, (ii) Bowley's coefficient of skewness (iii) skewness based on the moments.	[3L]
	Kurtosis: • Types of Kurtosis curves, • Measures of Kurtosis.	[1L]
2.5	Numerical Problems	[6L]

References:

1. A. M. Gun, M. K. Gupta & B. Dasgupta: Fundamentals of Statistics (Volume One) - World Press Private Ltd (1 August 2013)
2. S. C. Gupta & V. K. Kapoor: Fundamentals of Mathematical Statistics, 12/e, Sultan Chand and Sons;
3. Barbara Illowsky, Openstax, Susan Dean: Introductory Statistics - Open Stax Textbooks (23 March 2022)
4. Neil Weiss: Introductory Statistics – 10/e, Pearson;
5. Marvin E Johnson: Basic Statistics - Independently Published; Illustrated Edi. (11 July 2020)
6. Prem S. Mann: Introductory Statistics – 10/e, John Wiley & Sons Inc;
7. Roxy Peck, Chris Olsen, Jay L. Devore: Introduction to Statistics and Data Analysis – 5/e, Cengage Learning.



Mapping of COs and PSOs

Course Learning Outcomes	Programme Outcomes					
	1	2	3	4	5	6
Understand the concept of data.	X	X				
Demonstrate a understanding of the fundamental Concepts of Descriptive statistics, Including measures of Central tendency and measures of Dispersion.	X	X				
Summarize and organize Data effectively using appropriate descriptive statistics techniques.	X	X	X			
Interpret and analyze data sets accurately.				X	X	
Apply the appropriate descriptive statistics techniques for different types of data, Such as discrete variable & continuous variables.	X	X	X			
Calculate and interpret various partition values.	X	X	X			
Apply critical thinking and problem-Solving skills to datasets, effectively utilizing descriptive Statistics techniques to draw meaningful conclusions.		X	X	X		

Question Paper Template

Unit	Remembering/ Knowledge (1)	Understanding (2)	Applying (3)	Analysing (4)	Evaluating (5)	Creating (6)	Total marks
I	25%	35%	30%	10%	-	-	100%
II	25%	35%	30%	10%	-	-	100%



F.Y.B.Sc. (MATHEMATICS) SEMESTER I

COURSE TITLE: MINOR LAB COURSE (Statistics)

COURSE CODE: STMN-S1PR1-2CR24 [Credit- 02]

Course Learning Outcomes

After the successful completion of the Course, the learner will be able to:

1. Students will be able to draw the descriptive statistics for the data and interpret the data
2. Learn how to calculate measures of central tendency and measures of dispersion

PRACTICAL Minor (STMN-S1PR1-2CR24) (Lab Course - I Stat)

- 1 Calculation of Arithmetic Mean, Geometric mean and Harmonic mean for the simple series, discrete frequency distribution & continuous frequency distribution
- 2 Calculation of Median for the simple series, discrete frequency distribution & continuous frequency distribution
- 3 Calculation of Mode for the simple series, discrete frequency distribution & continuous frequency distribution
- 4 Calculation of quartiles, deciles and percentiles for simple series, Discrete frequency distribution, Continuous frequency distribution.
- 5 Finding missing frequency for discrete frequency distribution & continuous frequency distribution
- 6 Calculation of Combine Mean and Weighted Mean
- 7 Calculation of range, relative measure of range, quartile deviation, coefficient of quartile deviation
- 8 Calculation of Mean deviation, coefficient of mean deviation
- 9 Calculation of variance & standard deviation
- 10 Comparison of two series with the use of coefficient of variation.
- 11 Calculation of Raw Moments, Central Moments and moments about arbitrary value,
- 12 Coefficient of skewness and Kurtosis for a simple series, discrete frequency distribution & continuous frequency distribution
- 13 Calculation of Karl Pearson's coefficient of skewness
- 14 Calculation of Bowley's coefficient of skewness.

Minimum number of experiments: 12



F.Y.B.Sc. (Mathematics) SEMESTER I

Multidisciplinary Course

COURSE TITLE: Descriptive Statistics-I

COURSE CODE: MHMDC-S1P3-4CR25 [CREDITS - 04]

Course learning outcome		
At the end of this course, Students will be able to		
1. Distinguish between different types of data. 2. Collect, classify and tabulate a given data and study graphical and diagrammatic representations through Bar diagrams, Pie diagram, Histogram, Frequency polygon 3. Understand measures of central tendency, viz., Mean, Median, Mode etc. 4. Workout simple problems in discrete and continuous series. 5. Draw meaningful conclusions from a set of data. 6. Analyze measures of dispersion namely range, quartile deviation, standard deviation and co-efficient of variation for individual, discrete and continuous type data.		
Module 1	Collection, Classification and Tabulation of data	[12L]
Learning Objective		
1. Students will understand the meaning and purpose of data collection. 2. Students will learn about classification of data for further statistical analysis 3. Students will learn about tabulation of the data.		
Learning Outcomes:		
At the end of this module the learner will be able to		
1. Identify the types of data. 2. Collect, classify and tabulate a given data		
1.1	➤ Concept and Types of Data: ▪ Qualitative and quantitative data, Discrete and continuous data, ▪ Level of measurements of data	[02L]
1.2	➤ Collection of data: ▪ Primary data and Secondary data	[02L]
1.3	➤ Classification of data: ▪ Meaning, and Types of classification,	[01L]
1.4	➤ Tabulation of data: ▪ Meaning and Types of tables, ▪ Univariate frequency distribution: Discrete and continuous frequency distribution, Cumulative frequency distribution, ▪ Bivariate frequency distribution: Discrete and continuous bivariate frequency distribution, marginal and conditional frequency distribution.	[07L]



Module 2		Diagrammatic and graphic presentation of data	[14L]
Learning Objective 1. Learn importance of diagrammatic presentation of data. 2. Construct and interpret different types of diagrams and graphs.			
Learning Outcomes: At the end of this module the learner will be able to 1. Learn how to visualize data.			
2.1	➤ Diagrams: ▪ Introduction and Types of diagrams: ○ Line diagrams, Bar diagrams (simple, multiple, sub-divided and percentage-divided), Box plot and Pie diagram		[08L]
2.2	➤ Graphs: ▪ Introduction of Graphs: ▪ Graphs of frequency distributions: Histogram, Frequency polygon, Frequency curve, Cumulative frequency polygon, Cumulative frequency curve.		[06L]
Module 3		Measures of central tendency	[16L]
Learning Objective 1. To provide details & computations of different measures of Central tendency. 2. Distinguish between different types of averages.			
Learning Outcomes: At the end of this module the learner will be able to 1. Understand measures of central tendency, viz., Mean, Median and Mode in series of individual observations and Discrete or Continuous series. 2. Recognize, describe, and calculate the measures of location of data: quartiles and percentiles. 3. Draw meaningful conclusions from a set of data.			
3.1	➤ Concept of measures of central tendency, Requisites of good measures of central tendency		[02L]
3.2	➤ Measures of central tendency: Arithmetic Mean, Geometric Mean, Harmonic Mean, Median, and Mode		[08L]
3.3	➤ Partition values: Quartiles and Percentiles		[04L]
3.4	➤ Empirical relationship between mean, median and mode.		[02L]
Module 4		Measures of Dispersion and moments	[18L]
Learning Objective 1. Understand various types of measures of dispersion 2. Differentiate between absolute and relative measures. 3. Learn to calculate different measure of dispersion.			



Learning Outcomes:

At the end of this module the learner will be able to

1. Understand the limitations of average and so that uses of various measures of dispersion for analysis of data;
2. Draw meaningful conclusions from a set of data.

4.1	➤ Meaning of dispersion, Significance of measuring variation	[02L]
4.2	➤ Characteristic of an ideal measure of dispersion. ➤ Absolute and relative measures of dispersion: Range, Quartile deviation, Standard deviation ➤ Variance and Coefficient of variation	[12L]
4.3	➤ Moments: Raw moments, Central moments, ➤ Relations of above moments (without proof)	[04L]

References:

2. A. M. Gun, M. K. Gupta & B. Dasgupta: Fundamentals of Statistics (Volume One) - World Press Private Ltd (1 August 2013)
3. Barbara Illowsky, Openstax, Susan Dean: Introductory Statistics - Open Stax Textbooks (23 March 2022)
4. Neil Weiss: Introductory Statistics – 10/e, Pearson;
5. Marvin E Johnson: Basic Statistics - Independently Published; Illustrated Edi. (11 July 2020)
6. Prem S. Mann: Introductory Statistics – 10/e, John Wiley & Sons Inc;
7. Roxy Peck, Chris Olsen, Jay L. Devore: Introduction to Statistics and Data Analysis – 5/e, Cengage Learning.
8. Daren Starnes, Josh Tabor: The Practice of Statistics: For the Ap Exam– 6 /e, W.H.Freeman & Co Ltd.



Mapping of COs and PSOs

Course Learning Outcomes	Programme Outcomes					
	1	2	3	4	5	6
Distinguish between different types of data.		X				
Collect, classify and tabulate a given data and study graphical and diagrammatic representations through Bar diagrams, Pie diagram, Histogram, Frequency polygon	X			X		X
Understand measures of central tendency, viz., Mean, Median, Mode etc.	X	X	X			X
Analyses measures of dispersion namely range, quartile deviation, standard deviation and co-efficient of variation for individual, discrete and continuous type data.			X		X	X
Workout simple problems in discrete and continuous series.	X			X	X	X
Draw meaningful conclusions from a set of data.	X				X	X

Question Paper Template

Unit	Remembering/ Knowledge (1)	Understanding (2)	Applying (3)	Analysing (4)	Evaluating (5)	Creating (6)	Total marks
I	30%	40%	-	-	-	30%	100%
II	30%	40%	-	-	-	30%	100%
III	20%	40%	40%	-	-	-	100%
IV	20%	40%	40%	-	-	-	100%