	Internal Exam	Assignment	Project Evaluation	End Semester Examinations
CO 1	✓	✓		✓
CO 2	✓	✓		✓
CO 3	✓			✓
CO 4	✓	✓		✓
CO 5		✓		✓
CO 6	✓			

Programme	BSc Statistics
Course Code	STA1MN105 (P)
Course Title	Descriptive statistics
Type of Course	Minor
Semester	I
Academic	100 - 199

Level					
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	3	-	2	75
Pre-requisites	Familiarity with different types of data, understanding of common data visualization techniques, basic algebraic concepts.				
Course Summary	Build a foundation in data understanding, covering primary/secondary, quantitative/qualitative data, along with graphical representation like bar diagrams, central tendency, and dispersion measures, leading to practical survey and software applications.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand data types and sampling techniques and critically evaluate ethical implications of statistical methods aligning with human values.	U	C	Instructor-created exams / Quiz
CO2	Master diagrammatic representation and frequency distribution	U	F	Practical Assignment / Observation of Practical Skills/ Instructor-created exams
CO3	Apply measures of central tendency with practical examples and analyze data to help entrepreneurial decisions using critical thinking skills.	Ap	C	Seminar Presentation / Group Tutorial Work/ Instructor-created exams
CO4	Grasp measures of dispersion and their applications	U	C	Instructor-created exams / Home Assignments
CO5	Conduct a survey and apply acquired skills using software	U	F	One Minute Reflection Writing assignments/ Instructor-created exams
CO6	Exlapin how to calculate measures of central tendency and dispersion using JASP software.	Ap	P	Viva Voce/ Instructor-created exams
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

Detailed Syllabus:

Module	Unit	Content	Hrs (45+ 30)	Marks
I	**A basic idea about data**		**6**	**15**
	1	Primary and secondary data	3	
	2	Quantitative and qualitative data	1	
	3	Population and sample, Sampling and census	1	
	4	Discrete and continuous data	1	
	Sections from References: Unit 1: 2.2 [Ref 2] Unit 2: 11.1 [Ref 2] Unit 3: 12.1 [Ref 1] Unit 4: 2.1 [Ref 2]			
II	**Diagrammatic representation of data**		**15**	**15**
	5	Bar diagrams, pie diagram, Pictograms	5	
	6	Four types of classification	1	
	7	Frequency distribution, discrete and continuous frequency tables	6	
	8	Terms used in a frequency distribution, Cumulative frequency tables	3	
	Sections from References: Unit 5: 4.3(4.3.2 to 4.3.7) [Ref 2] Unit 6: 5.3 Ref[2] Unit 7: 3.3[Ref 2] Unit 8: 3.5 [Ref 2]			
III	**Measures of central tendency**		**14**	**20**

	9	Mean, Median, Mode	9	
	10	Geometric mean and Harmonic mean with simple applications	4	
	11	Empirical relation connecting mean, median and mode	1	
	Sections from References: Unit 9: 2.5,2.6,2.7 [Ref 1], Chapter 2 [Ref 3] Unit 10: 2.8,2.9 [Ref 1] Unit 11: 2.7 [Ref 1]			
IV	**Measures of dispersion**		**10**	**20**
	12	Range, Standard deviation,	4	
	13	Quartile deviation	4	
	14	Coefficient of variation	2	
	Sections from References: Unit 12: Section 1 and 4, Chapter 3 [Ref 3] Unit 13: Section 2, Chapter 3 [Ref 3] Unit 14: 3.8.1 [Ref 1]			
V	**PRACTICUM**		**30**	
	Do practice problems in JASP software from any 5 units of the given list and one additional problem decided by the teacher-in-charge, related to the content of the course. Other units listed here may be used as demonstrations of the concepts taught in the course.			
	1	Installing JASP		
	2	Loading data in JASP		
	3	Quitting JASP		

	4	Calculating mean in JASP		
	5	Calculating Median in JASP		
	6	Calculating mode in JASP		
	7.	Calculating range in JASP		
	8	Calculating interquartile range in JASP		
	Sections from References: Unit 1: 3.1 Ref[4] Unit 2: 3.3 Ref[4] Unit 3: 3.6 Ref[4] Unit 4: 4.1.2 Ref[4] Unit 5: 4.1.3 Ref[4] Unit 6: 4.1.6 Ref[4] Unit 7: 4.2.1 Ref[4] Unit 8: 4.2.2 Ref[4]			

Books and References:

1. Gupta, S.C. and Kapoor, V.K. (1997) Fundamentals of Mathematical Statistics. Sultan Chand and Sons, New Delhi

2. S.P Gupta (2021),Statistical Methods 46 th Edition

3. Garrett, H.E. and Woodworth, R.S. (1973) Statistics in Psychology and education. Vakils, Feffer and Simons Private Ltd, Bombay.

4. Navarro, D.J., Foxcroft, D.R., & Faulkenberry, T.J. (2019). Learning Statistics with JASP: A Tutorial for Psychology Students and Other Beginners. (Version).

Mapping of COs with PSOs and POs :

	PSO 1	PSO 2	PSO 3	PSO4	PSO 5	PSO6	PO1	PO2	PO3	PO4	PO5	PO6
CO 1	2	3	-	-	-	2	3	2	-	-	-	3
CO 2	-	2	3	-	-	2	2	2	-	-	3	-
CO 3	3	-	2	-	3	3	3	2	2	3	-	-
CO 4	-	-	-	-	-	3	2	3	-	-	-	-
CO 5	2	-	-	-	-	-	2	1	-	-	-	2
CO 6	-	3	-	-	-	2	1	2	-	-	-	-

Correlation Levels:

Level	**Correlation**
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

Assessment Rubrics:

- Quiz / Assignment/ Quiz/ Discussion / Seminar
- Midterm Exam
- Programming Assignments (20%)
- Final Exam (70%)

Mapping of COs to Assessment Rubrics :

	Internal Exam	Assignment	Project Evaluation	End Semester Examinations
CO 1	✓			✓

CO 2	✓	✓		✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5		✓		✓
CO 6	✓			

Programme	BSc Statistics				
Course Code	STA2MN105 (P)				
Course Title	Introduction to Probability				
Type of Course	Minor				
Semester	II				
Academic Level	100 - 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	3	-	2	75
Pre-requisites	Understanding of fundamental probability concepts. Ability to manipulate and analysze basic data sets, perform simple calculations.				
Course Summary	Deepen statistical knowledge with correlation types, regression properties, and probability theory, including the relationship between correlation and regression coefficients, alongside introducing probability concepts, random variables, and distribution functions, applied through practical exercises.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Comprehend types of correlation and scatter diagrams and analyze data to help entrepreneurial decisions using critical thinking skills.	U	C	Instructor-created exams / Quiz/ Instructor-created exams
CO2	Understand properties of regression coefficients and critically evaluate ethical implications of statistical methods aligning with human values.	U	C	Practical Assignment / Observation of Practical Skills/ Instructor-created exams
CO3	Introduce and apply probability theory concepts.	U	C	Seminar Presentation / Group Tutorial Work
CO4	Grasp the definition and types of	U	C	Instructor-crea

	random variables.			ted exams / Home Assignments
CO5	Develop critical thinking skills to interpret and communicate results of statistical analysis effectively.	U	F	One Minute Reflection Writing assignments/ Instructor-created exams
CO6	Describe how to draw scatter plot for correlation in JASP.	Ap	P	Viva Voce/ Instructor-created exams
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

Detailed Syllabus:

Module	**Unit**	**Content**	**Hrs (45+30)**	**Marks 70**
I		**Correlation**	**12**	**15**
	1	Bivariate Distribution, Correlation	2	
	2	Scatter Diagram	1	
	3	Karl Pearson coefficient of correlation	2	
	4	Limits for Correlation Coefficient	2	
	5	Assumptions Underlying Karl Pearson's Correlation Coefficient	1	
	6	Rank Correlation	3	
	Sections from References: Unit 1: 10.1 Ref[2] Unit 2: 10.2 Ref[2] Unit 3: 10.3 Ref[2] Unit 4: 10.3.1 Ref[2] Unit 5: 10.3.2 Ref[2] Unit 6: 10.6 Ref[2]			

II	**Regression**		**14**	**20**
	7	Regression	2	
	8	The two regression lines	3	
	9	Regression coefficients	3	
	`10	Properties of regression coefficients	3	
	11	Relation between coefficient of correlation and regression coefficients	3	
	Sections from References: Unit 7: 10.7 Ref[2] Unit 8: 10.7.1 Ref[2] Unit 9: 10.7.3 Ref[2] Unit 10: 10.7.4 Ref[2] Unit 11: 10.7.4 Ref[2]			
III	**Introduction to Probability**		**10**	**15**
	12	Terms in Probability	3	
	13	Mathematical or Classical Probability	1	
	14	Statistical or Empirical Probability	1	
	15	Axiomatic approach to Probability	2	
	16	Addition theorem for two events (statement only)	1	
	17	Conditional Probability	2	
	18	Independence of events		

	Sections from References: Unit 12: 4.3 Ref[2] Unit 13: 4.3.1 Ref[2] Unit 14: 4.3.2 Ref[2] Unit 15: 4.5 Ref[2] Unit 16: 4.6.2 Ref[2] Unit 17: 4.7 Ref[2] Unit 18: 4.7.3 Ref[2]			
IV	**Random variables**		**9**	**20**
	19	Definition of random variable	2	
	20	Probability mass function	2	
	21	Probability density function	2	
	22	Distribution function	3	
	Sections from References: Unit 19: 5.1 Ref[2] Unit 20: 5.6 Ref[2] Unit 21: 5.4.1 Ref[2] Unit 22: 5.4 Ref[2]			
V	**PRACTICUM**		**30**	
	Do practice problems in JASP software from any 5 units of the given list and one additional problem decided by the teacher-in-charge, related to the content of the course. Other units listed here may be used as demonstrations of the concepts taught in the course.			
	1	Problems on plotting scatter plots		
	2	Correlation calculation		
	3	Interpretation of correlation coefficient in JASP		

	4.	Finding Rank correlation		
	5	Introduce correlation matrix in JASP		
	6	Linear regression model		
	7	Model checking		
	8	Model selection		
	Sections from References: Unit 1: 11.1.1 Ref[4] Unit 2: 11.1.3 Ref[4] Unit 3:11.1.5 Ref[4] Unit 4: 11.1.6 Ref[4] Unit 5: 11.2 Ref[4] Unit 6: 11.3 Ref[4] Unit 7:11.10 Ref[4] Unit 8:11.11 Ref[4]			

Books and References:

1. Goon A.M., Gupta M.K. and Dasgupta B. (2002): Fundamentals of Statistics, Vol. I , 8th Edn. The World Press, Kolkata.
2. Gupta, S.C. and Kapoor, V.K. (1997) Fundamentals of Mathematical Statistics. Sultan Chand and Sons, New Delhi
3. Garrett, H.E. and Woodworth, R.S. (1973) Statistics in Psychology and education. Vakils, Feffer and Simons Private Ltd, Bombay.
4. Navarro, D.J., Foxcroft, D.R., & Faulkenberry, T.J. (2019). Learning Statistics with JASP: A Tutorial for Psychology Students and Other Beginners. (Version).

Mapping of COs with PSOs and POs :

	PSO 1	PSO 2	PSO 3	PSO4	PSO 5	PSO6	PO1	PO2	PO3	PO4	PO5	PO6
CO 1	2	3	2	-	-	2	2	1	-	-	3	-

CO 2	2	-	-	-	-	-	1	2	-	-	-	3
CO 3	-	3	-	2	2	2	2	1	2	-	-	-
CO 4	3	2	-	-	-	3	3	2	-	-	-	-
CO 5	2	-	-	-	-	-	2	2	-	-	-	-
CO 6	2	2	3	-	-	3	3	2	-	3	-	-

Correlation Levels:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

Assessment Rubrics:

- Quiz / Assignment/ Quiz/ Discussion / Seminar
- Midterm Exam
- Programming Assignments (20%)
- Final Exam (70%)

Mapping of COs to Assessment Rubrics :

	Internal Exam	Assignment	Project Evaluation	End Semester Examinations
CO 1	✓			✓

CO 2	✓	✓		✓
CO 3	✓			✓
CO 4		✓		✓
CO 5	✓	✓		✓
CO 6	✓			

Programme	BSc Statistics				
Course Code	STA3MN205 (P)				
Course Title	Inferential statistics				
Type of Course	Minor				
Semester	III				
Academic Level	200 - 299				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	3	-	2	75
Pre-requisites	Awareness of different types of data sets, basic understanding of probability theory				
Course Summary	Discover statistical testing basics, including null and alternative hypotheses, critical regions, and test statistics like z, t, F, and Chi-square, with applications such as t-tests, ANOVA, and practical software exercises.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand testing fundamentals and hypotheses.	U	C	Instructor-created exams / Quiz
CO2	Grasp test statistics and critical values.	U	C	Practical

				Assignment / Observation of Practical Skills/ Instructor-created exams
CO3	Apply t-tests and chi-square tests and analyze data to help entrepreneurial decisions using critical thinking skills.	Ap	F	Seminar Presentation / Group Tutorial Work/ Instructor-created exams
CO4	Ability to calculate probabilities using normal distribution.	U	C	Instructor-created exams / Home Assignments
CO5	Comprehend Analysis of Variance and critically evaluate ethical implications of statistical methods aligning with human values.(ANOVA)	U	F	One Minute Reflection Writing assignments/ Instructor-created exams
CO6	Conduct one sample tests in JASP software.	Ap	P	Viva Voce/ Instructor-created exams
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

Detailed Syllabus:

Module	**Unit**	**Content**	**Hrs (48+30)**	**Marks 70**
I		**Fundamentals of Testing**	**12**	**15**
	1	Tests of significance-Introduction	2	
	2	Null hypothesis	1	
	3	Alternative hypothesis	1	
	4	Errors in hypothesis testing	3	
	5	Critical region and Level of Significance	3	
	6	One and two tailed tests	2	

	Sections from References: Unit 1: 12.4 Unit 2:12.5 Unit 3:12.5.1 Unit 4: 12.6 Unit 5:12.7 Unit 6: 12.7.1			
II	**Distribution Theory**		**10**	**15**
	7	Normal distribution-Properties	2	
	8	Properties of Normal distribution	1	
	9	Standard normal distribution	1	
	10	Problems with table values	2	
	11	Statistic of Chi-square distribution	2	
	12	Statistic of Student’s t distribution	1	
	13	Statistic of F distribution	1	
	Sections from References: Unit 7:8.2.2 Ref[2] Unit 8: 8.2.2 Ref[2] Unit 9: 8.2.14 Ref[2] Unit 10: 8.2.14 Ref[2] Unit 11: 13.1 Ref[2] Unit 12: 14.2 Ref[2] Unit 13: 14.5 Ref[2]			

III	**Tests of Hypothesis**		**14**	**20**
	14	Steps for testing of hypothesis	2	
	15	t test for single mean	3	
	16	t test for difference of means	3	
	17	Chi square tests for Goodness of fit	3	
	18	Chi square test for independence of two attributes	3	
	Sections from References: Unit 14:12.7.3 Ref[2] Unit 15: 14.2.9 Ref[2] Unit 16: 14.2.10 Ref[2] Unit 17: 13.7.2 Ref[2] Unit 18: 13.7.3 Ref[2]			
IV	**Analysis of variance**		**9**	**20**
	19	Introduction to Analysis of variance	1	
	20	Assumptions	2	
	21	Techniques of ANOVA	2	
	22	One way ANOVA	4	
	Sections from References: Unit 19: 5.5 Ref[1] Unit 20:5.6 Ref[1] Unit 21: 5.7 Ref[1] Unit 22:5.7 Ref[1]			

V	**PRACTICUM**		**30**	
	Do practice problems using JASP software from any 5 units of the given list and one additional problem decided by the teacher-in-charge, related to the content of the course. Other units listed here may be used as demonstrations of the concepts taught in the course.			
	1	Chi-square goodness of fit test		
	2	Chi-square test for independence		
	3	One sample t test		
	4	How ANOVA works in JASP		
	5	Running ANOVA in JASP		
	6	An illustrative data set		
	7	Assumptions of one way ANOVA		
	8	Continuity correction		
	Unit 1:9.1Ref[3] Unit 2: 9.2 Ref[3] Unit 3: 10.2 Ref[3] Unit 4:12.2 Ref[3] Unit 5:12.3 Ref[3] Unit 6:12.1 Ref[3] Unit 7: 12.6 Ref[3]			

	Unit 8: 9.3 Ref[3]		

Books and References:

1. S.P Gupta (2021), Statistical Methods 46 th Edition Gupta, S.C. and Kapoor, V.K. (1997)

2. Fundamentals of Mathematical Statistics. Sultan Chand and Sons, New Delhi

3. Navarro, D.J., Foxcroft, D.R., & Faulkenberry, T.J. (2019). Learning Statistics with JASP: A Tutorial for Psychology Students and Other Beginners. (Version).

Mapping of COs with PSOs and POs :

	PSO 1	PSO 2	PSO 3	PSO4	PSO 5	PSO6	PO1	PO2	PO3	PO4	PO5	PO6
CO 1	-	2	-	-	-	2	2	2	-	-	-	-
CO 2	3	3	-	-	-	3	3	1	-	-	-	-
CO 3	-	-	2	-	-	2	2	2	-	-	3	-
CO 4	2	3	2	-	-	3	3	2	-	3	-	-
CO 5	-	2	-	2	3	-	2	2	1	-	-	3
CO 6	3	-	3	-	-	-	2	1	-	3	-	-

Correlation Levels:

Level	Correlation

-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

Assessment Rubrics:

- Quiz / Assignment/ Quiz/ Discussion / Seminar
- Midterm Exam
- Programming Assignments (20%)
- Final Exam (70%)

Mapping of COs to Assessment Rubrics :

	Internal Exam	Assignment	Project Evaluation	End Semester Examinations
CO 1	✓	✓		✓
CO 2	✓			✓
CO 3	✓			✓
CO 4	✓	✓		✓
CO 5		✓		✓
CO 6	✓			

Programme	BSc Statistics				
Course Code	STA1FM102				
Course Title	Fundamentals of Statistics				
Type of Course	MDC				
Semester	I				
Academic Level	100 - 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	3	3	-	-	45
Pre-requisites	Basic mathematical knowledge				
Course Summary	Students will learn about different types of data, scales of measurement, and techniques for representing and summarizing data using measures of central tendency and dispersion, as well as exploring concepts of skewness and kurtosis.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Define statistics and its scope in various fields of study, including its role in decision-making.	U	C	Instructor-created exams / Quiz
CO2	Construct tables and diagrams to organize and summarize data efficiently for analysis and analyze data to help entrepreneurial decisions using critical thinking skills.	Ap	C	Instructor-created exams / Seminar Presentation
CO3	Create various types of diagrams such as bar graphs, pie charts, and histograms for visual representation of data and critically evaluate ethical implications of statistical methods aligning with human values.	Ap	F	Seminar Presentation / Group Tutorial Work/ Instructor-created exams
CO4	Compute measures of central tendency including mean, median, and mode to identify typical or central values within a data set.	Ap	C	Instructor-created exams / Home Assignments
CO5	Interpret partition values such as quartiles and percentiles to identify specific data points within a distribution.	U	F	One Minute Reflection Writing assignments/ Instructor-creat

				ed exams
CO6	Illustrate measures of central tendency and dispersion using spread sheet.	Ap	P	Viva Voce/ Instructor-created exams
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

COURSE CONTENT

Module		Content	Hours (36+9)	Marks (50)
1	**Introduction to Statistics**		**8**	**10**
	1	Definition of Statistics	1	
	2	Scope of Statistics	2	
	3	Concepts of statistical population and sample	2	
	4	Collection of data	3	
	Sections from References: Unit 1: 1.1&1.2 [Ref 1] Unit 2: 1.3 [Ref 1] Unit 3: 1.3 [Ref 2] Unit 4: 1.4 [Ref 2]			
2	**Organizing and Graphing Data**		**12**	**15**
	5	Types of data	3	
	6	Scale of measurements	2	
	7	Classification of data	2	
	8	Tabulation of data	2	
	9	Diagrammatic representation of data	3	
	Sections from References: Unit 5: 2.1 [Ref 2] Unit 6: 2.1 [Ref 1] Unit 7: 2.1[Ref 1] Unit 8: 2.3[Ref 2] Unit 9: 2.2 [Ref 1 and 2]			
3	**Measures of Central Tendency & Dispersion**		**11**	**15**
	10	Arithmetic Mean	2	
	11	Geometric Mean	1	
	12	Harmonic Mean	1	
	13	Median & Mode	2	

	14	Measures of Dispersion - Definition	1	
	15	Absolute Measures of Dispersion	4	
	Sections from References: Unit 10: 2.3, 2.4 & 2.5 [Ref 1] Unit 11: 2.8 [Ref 1] Unit 12: 2.9[Ref 1] Unit 13: 2.6 & 2.7[Ref 1] Unit 14: 3.1 [Ref 1] Unit 15: 3.4,3.5,3.6, & 3.7 [Ref 1]			
4	**Skewness & Kurtosis**		**5**	**10**
	16	Partition values	3	
	17	Skewness	1	
	18	Kurtosis	1	
	Sections from References: Unit 16: 2.11 [Ref 1] Unit 17: 3.13 [Ref 1] Unit 18: 3.14[Ref 1]			
5	**Open ended: practical problems Using Spreadsheet**		**9**	
	1	Frequency distributions for organizing and summarizing data	3	
	2	Measures of Central Tendency	3	
	3	Measures of Dispersion	3	
	Sections from References: Unit 1: 2.1Ref [3] Unit 2: 2.2 Ref [3] Unit 3: 3.2 Ref [3]			
	Books and References: ▪ Gupta, S. C. and Kapoor, V. K. (2002). Fundamentals of Mathematical Statistics. **,** 11th edition, Sulthan Chand, New Delhi. ▪ Prem. S. Mann (2010). Introductory Statistics, 7th edition, Wiley ▪ Mario F Triola, Elementary Statistics using Excel, (2018), 6th edition.			

Mapping of COs with PSOs and POs :

	PSO 1	PSO 2	PSO 3	PSO4	PSO 5	PSO6	PO1	PO2	PO3	PO4	PO5	PO6
CO 1	-	-	1	-	2	-	2	1	-	-	-	-
CO 2	2	2	-	-	-	2	2	2	-	-	-	3
CO 3	-	-	3	-	-	-	1	-	-	-	3	-
CO 4	2	2	3	-	3	2	2	-	2	3	-	-
CO 5	-	2	-	2	2	3	2	3	2	-	-	-
CO 6	3	2	-	-	-	3	3	-	-	3	-	-

Correlation Levels:

Level	**Correlation**
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

Assessment Rubrics:

6. Quiz / Assignment/ Quiz/ Discussion / Seminar
7. Midterm Exam
8. Programming Assignments (20%)
9. Final Exam (70%)

Mapping of COs with PSOs and POs :

	PSO 1	PSO 2	PSO 3	PSO4	PSO 5	PSO6	PO1	PO2	PO3	PO4	PO5	PO6
CO 1	2	3	-	2	2	3	3	-	3	-	2	2
CO 2	3	-	-	-	-	-	2	-	-	-	-	2
CO 3	-	-	2	-	-	2	2	2	-	-	3	-
CO 4	-	-	3	-	-	2	2	2	-	-	3	3
CO 5	-	-	3	-	-	2	1	-	-	2	3	2
CO 6	3	2	-	-	-	3	3	3	-	-	-	-

Correlation Levels:

Level	**Correlation**
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

Assessment Rubrics:

6. Quiz / Assignment/ Quiz/ Discussion / Seminar
7. Midterm Exam
8. Programming Assignments (20%)
9. Final Exam (70%)

Mapping of COs to Assessment Rubrics :

	Internal Exam	Assignment	Project Evaluation	End Semester Examinations
CO 1	✓	✓		✓
CO 2	✓			✓
CO 3	✓			✓
CO 4		✓		✓
CO 5		✓		✓
CO 6	✓			

Programme	BSc Statistics
Course Code	STA2FM104

Course Title	Statistical sampling and probability theory				
Type of Course	MDC				
Semester	II				
Academic Level	100 - 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	3	3	-	-	45
Pre-requisites					
Course Summary	Students will learn a comprehensive understanding of fundamental concepts in statistics, including data, variables, attributes, and methods of data collection and explore various types of sampling methods and understand the basics of probability theory.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Define and differentiate between data, variables, and attributes, and understand their role in statistical analysis.	U	C	Instructor-created exams / Quiz
CO2	Demonstrate proficiency in preparing questionnaires for data collection, considering factors such as clarity, relevance, and reliability and critically evaluate ethical implications of statistical methods aligning with human values..	U	F	Seminar Presentation / Instructor-created exams
CO3	Identify and describe different types of sampling methods, including simple random sampling, stratified random sampling, systematic sampling, and cluster sampling and analyze data to help entrepreneurial decisions using critical thinking skills.	R	C	Seminar Presentation / Group Tutorial Work/ Instructor-created exams
CO4	Define random experiment, sample space, and event, and understand their relevance in probability theory.	U	C	Instructor-created exams / Home Assignments
CO5	Define probability and understand its interpretation as a measure of uncertainty.	U	F	One Minute Reflection Writing assignments/ I

				nstructor-created exams
CO6	Represent how to list different types of data using any software	Ap	P	Viva Voce/ Instructor-created exams

* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)
\# - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)

COURSE CONTENT

Module		**Content**	**Hours (36+9)**	**Marks (50)**
	Basic Statistics		**10**	**10**
1	**1**	Data	2	
	2	Variables and Attributes	2	
	3	Definition of Population and Sample	3	
	4	Preparation of questionnaire for data collection	3	
	Sections from References: Unit 1: 2.1 [Ref 2] Unit 2: 1.5[Ref 2] Unit 3: 1.3 [Ref 2] Unit 4: 1 [Ref 2]			
	Census and Sampling		**6**	**10**
2	**5**	Census and Sampling	2	
	6	Principal steps in a sample survey	2	
	7	Types of sampling	1	
	8	Sampling methods	1	
	Sections from References: Unit 5: 15.2,15.3,15.6 [Ref 3] Unit 6: 15.8 [Ref 3] Unit 7:15.10[Ref 3] Unit 8:15.10[Ref 3]			
	Random Sampling Methods		**9**	**15**
3	**9**	simple random sampling with and without replacement	5	

	10	Stratified random sampling (concept only)	2	
	11	Systematic Sampling (concept only)	1	
	12	Cluster sampling (concept only)	1	
	Sections from References: Unit 9:15.11,15.11.1 [Ref 3] Unit 10: 15.12,15.12.1 [Ref 3] Unit 11: 15.13 [Ref 3] Unit 12:A2 [Ref 2]			
	Introduction to Probability		**11**	**15**
4	**13**	Random experiment	1	
	14	Sample space	1	
	15	event	2	
	16	Statistical regularity	3	
	17	Definition of Probability	2	
	18	Concept of conditional probability of two events	2	
	Sections from References: Unit 13: 4.5.1 Ref [1] Unit 14: 4.5.1 Ref [1] Unit 15: 4.5.2 Ref [1] Unit 16: 4.5 Ref [1] Unit 17: 4.6 Ref [1] Unit 18: 4.6 Ref [1]			
5	**Open ended - Practical problems using softwares**		**9**	
	1	Data collection	**3**	
	2	Sample selection	**3**	
	3	Probability	**3**	
	Books and References: 6. Gupta, S. C. and Kapoor, V. K. (2002). Fundamentals of Mathematical Statistics. **,** 11th edition, Sulthan Chand, New Delhi. 7. Prem. S. Mann (2010). Introductory Statistics, 7th edition, Wiley **8.** Gupta, S. C. (2015). Fundamentals of Statistics, Himalaya Publishing House			

Mapping of COs with PSOs and POs :

	PSO 1	PSO 2	PSO 3	PSO4	PSO 5	PSO6	PO1	PO2	PO3	PO4	PO5	PO6
CO 1	2	3	-	-	-	3	3	3	-	-	-	-
CO 2	2	2	-	-	-	2	2	2	-	-	-	3
CO 3	-	2	3	2	2	3	1	3	2	3	3	-
CO 4	3	2	-	-	-	3	3	3	-	-	-	-
CO 5	-	-	-	-	-	3	2	3	-	-	-	-
CO 6	-	-	3	-	-	-	2	2	-	3	-	-

Correlation Levels:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

Assessment Rubrics:

10. Quiz / Assignment/ Quiz/ Discussion / Seminar
11. Midterm Exam
12. Programming Assignments (20%)
13. Final Exam (70%)

Mapping of COs to Assessment Rubrics :

	Internal Exam	Assignment	Project Evaluation	End Semester Examinations
CO 1	✓			✓
CO 2	✓	✓		✓
CO 3	✓	✓		✓
CO 4		✓		✓
CO 5		✓		✓
CO 6	✓			

Programme	B. Sc. Statistics
Course Code	STA5FS101
Course Title	Statistical analysis using Python
Type of Course	SEC