Programme	**B.Sc. Statistics**
Course Code	**STA3MN205 (P)**
Course Title	**Inferential Statistics**
Type of Course	**Minor**
Semester	**III**
Academic	**200-299**

Level					
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.	Ap	C	Instructor-created exams / Quiz
CO2	Discuss Normal distribution in detail and Statistics of sampling distributions.	Ap	C	Practical Assignment / Observation of Practical Skills/ Instructor-created exams
CO3	Apply t-tests and chi-square tests and analyze data to help	Ap	C	Seminar Presentation / Group Tutorial Work/ Instructor-creat

	entrepreneurial decisions using critical thinking skills.			ed exams
CO4	Comprehend Analysis of Variance and critically evaluate ethical implications of statistical methods aligning with human values. (ANOVA)	Ap	C	Instructor-created exams / Home Assignments
CO5	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 (45+30)	Marks
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 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	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		
	Sections from References: 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]			

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, NewDelhi
3. Navarro, D.J., Foxcroft, D.R., & Faulkenberry, T.J. (2019). LearningStatistics with JASP: ATutorial for Psychology Students and Other Beginners. (Version).

Mapping of COs with PSOs and POs :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	2	2	3	0	3
CO2	3	1	2	2	3	0	3
CO3	3	1	2	2	3	0	3
CO4	3	1	2	2	3	0	3
CO5	3	1	2	2	3	0	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
CO1	✓	✓		✓
CO2	✓	✓		✓
CO3	✓	✓		✓
CO4	✓	✓		✓
CO5	✓			