Programme	B. Sc. Computer Science				
Course Title	**Fundamentals of SPSS and R programming**				
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	1. Basic computer knowledge 2. Spreadsheet essentials				
Course Summary	This course offers SPSS basics including data management, transformation, visualization and statistical analysis techniques. Also introduces fundamentals of R environment, focusing on data manipulation and visualization.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Summarize essential data input and manipulation activities within SPSS	U	P	Instructor-created exams / Quiz / Lab exercises
CO2	Apply descriptive statistics and conduct parametric and nonparametric tests in SPSS	Ap	P	Practical Assignments / Lab exercises / Problem-solving tests
CO3	Summarize overview of R environment	U	P	Instructor-created exams / Quiz
CO4	Describe parametric and non-parametric testing of statistical hypothesis	U	P	Instructor-created exams / Quiz / Case-based questions

CO5	Create effective visualizations using SPSS and R	C	P	Practical Assignment / Mini Project / Demonstration

* - 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	Marks
I	**Introduction to SPSS**		**12**	**19**
	1	Features –Data View –Variable View –Output Viewer Window – Syntax Editor Window -	1	
	2	Open data file , Save , import from other data source ,data entry , labelling for dummy numbers	2	
	3	Recode in to same variable, Recode in to different variable, Transpose of data, Insert variables and cases	2	
	4	Merge variables and cases, Split, Select cases, Compute total scores	2	
	5	Table looks –Changing column - font style and sizes	2	
	6	Diagrammatic representation	2	
II	**Data Analysis Using SPSS**		**10**	**18**
	7	Estimation of mean, median and mode- Standard deviation and coefficient of variation.	2	
	8	Descriptive statistics, Parametric tests t-test (paired or unpaired), ANOVA (one-way- two way)	2	

	9	Pearson rank correlation, Linear regression	3	
	10	Non parametric tests: Mann Whitney U test, Wilcoxon signed rank test .	2	
	11	Kruskall Wallis test ,Chi- Square test	1	
III	**Overview of R Environment**		**11**	**18**
	12	R editor, Workspace	2	
	13	Data type –Importing and Exporting Data	2	
	14	Basic Computational Ideas –Merges in R. Matrix Determinant –Inverse – Transpose,Trace)	3	
	15	Eigen Values and Eigen Vectors	2	
	16	Construction of Bar, Pie, Histogram, Line Chart, Box Plot, Scatter Plot	2	
IV	**Parametric and Non Parametric testing of Statistical Hypothesis**		**12**	**15**
	17	One Sample t test, Two group t tests, Paired t test, one way ANOVA, two way ANOVA	3	
	18	Wilcoxon, Mann Witney, Kruskal Wallis Simple Correlation	3	
	19	Linear Regression, Multiple Linear Regression, Testing for overall significance of Model Coefficients–Testing for Individual Regression Coefficients.	2	
	20	Outliers Detection Control Charts, Variable Control Chart, x, R, S.	2	
	21	Attribute Control Chart - p, np, c, u. CUSUM Control Chart, EWMA Control Chart.	2	

	22	Process Capability Analysis, Process Capability Analysis		
V	**Hands-on Word Processor and Presentation Tool:** **Practical Applications, Case Study and Course Project**		**30**	
		SPSS 1. Descriptive Statistics 2. Paired –Samples T Test 3. One-Way ANOVA 4. Correlation & Linear Regression 5. Chi- Square Test **R PROGRAMMING** 6. Simple Correlation 7. Linear Regression 8. One- Way ANOVA 9. Paired T test 10. Plotting Bar Chart	20	
		Case study(Example): **SPSS and R** 1. **Case Study: Customer Satisfaction Analysis** Analyze factors influencing customer satisfaction using survey data. Employ SPSS for regression analysis to identify significant predictors such as product quality, pricing, and customer service. Use R programming to analyse data and make predictions.	10	

Reference Books:

1. Michael S. Louis – Beck (1995). Data analysis an introduction, Series: quantitative applications in the social sciences. Sage, Publications. London

2. Jeremy J. Foster (2001). Data analysis using SPSS for windows. New edition. Versions 8-10. Sage publications. London.

3. Sprankle , M., Problem Solving & Programming Concepts, Pearson India

4. Learning Statistics using R By Rndall E.Schumacker, Sage Publication

5. R for Everyone By Jared P.Lander, Pearson Education

Mapping of COs with PSOs and POs :

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	-	-	-	-	-	-	1	1	3	3	1	1	1
CO2	-	-	-	-	-	-	2	1	3	3	3	1	1
CO3	-	-	-	-	-	-	1	1	3	3	3	1	1
CO4	-	-	-	-	-	-	1	1	3	3	3	1	1
CO5	-	-	-	-	-	-	1	2	3	3	3	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
CO1	✓	✓		✓
CO2		✓		✓
CO3	✓			✓
CO4	✓			✓
CO5		✓	✓	