



BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI - 620 024

B.Sc. STATISTICS

Choice Based Credit System -

Learning Outcomes Based Curriculum Frame Work (CBCS - LOCF)

(Applicable to the candidates admitted from the academic year 2026-27 onwards)

Sem.	Part	Course	Title	Ins. Hrs	Credit	Exam Hours	Marks		Total
							Int.	Ext.	
I	I	Ability Enhancement Course - I (AEC - I)	(Tamil\$/Other Languages+ #)	6	3	3	30	70	100
	II	Ability Enhancement Course - II (AEC - II)	English Course - I	6	3	3	30	70	100
	III	Core Course - 1 (CC 1)	Descriptive Statistics	4	4	3	30	70	100
		Core Practical - 1 (CP 1)	Statistics Practical - I	4	4	3	40	60	100
		Allied Course - 1 (AC 1)	Mathematics	4	4	3	30	70	100
		Allied Practical - 1 (AP 1)	Mathematics	2	**	**	**	**	**
	IV	Value Education		2	2	3	30	70	100
		Interdisciplinary Course - 1 (IDC 1) #	One Course from Outside Department	2	2	3	30	70	100
TOTAL				30	22	-	-	-	700
II	I	Ability Enhancement Course - III (AEC - III)	(Tamil\$/Other Languages+ #)	6	3	3	30	70	100
	II	Ability Enhancement Course - IV (AEC - IV)	English Course -II	6	3	3	30	70	100
	III	Core Course - 2 (CC 2)	Probability Theory	4	4	3	30	70	100
		Core Practical - 2 (CP 2)	Statistics Practical - II	4	4	3	40	60	100
		Allied Course - 2 (AC 2)	Mathematics	4	4	3	30	70	100
		Allied Practical - 1 (AP 1)	Mathematics	2	4	3	40	60	100
	IV	Skill Enhancement Course - 1 (SEC 1) ##	Naan Mudhalvan Course / SEC (List Enclosed)	2	2	3	30	70	100
		Interdisciplinary Course - 2 (IDC 2) #	One Course from Outside Department	2	2	3	30	70	100
TOTAL				30	26	-	-	-	800

III	I	Ability Enhancement Course - V (AEC - V)	(Tamil\$/Other Languages+#)	6	3	3	30	70	100
	II	Ability Enhancement Course - VI (AEC - VI)	English Course - III	6	3	3	30	70	100
	III	Core Course - 3 (CC 3)	Theoretical Discrete Distributions	4	4	3	30	70	100
		Core Practical - 3 (CP 3)	Statistics Practical - III	4	4	3	40	60	100
		Allied Course - 3 (AC 3)	Statistical Computation using R	4	4	3	30	70	100
		Allied Practical - 2 (AP 2)	Statistical Computation using Python	2	**	**	**	**	**
	IV	Skill Enhancement Course - 2 (SEC 2) ##	Naan Mudhalvan Course / SEC (List Enclosed)	2	2	3	30	70	100
		Interdisciplinary Course - 3 (IDC 3) \$\$	One Course from Outside Department	2	2	3	30	70	100
		Health and Wellness @		-	1	-			100
TOTAL			30	23	-	-	-	800	
IV	I	Ability Enhancement Course - V (AEC - V)	(Tamil\$/Other Languages+#)	6	3	3	30	70	100
	II	Ability Enhancement Course - VI (AEC - VI)	English Course - III	6	3	3	30	70	100
	III	Core Course - 4 (CC 4)	Theoretical Continuous Distributions	4	4	3	30	70	100
		Core Practical - 4 (CP 4)	Statistics Practical - IV	4	4	3	40	60	100
		Allied Practical - 2 (AP 2)	Statistical Computation using Python	2	4	3	40	60	100
		Allied Practical - 3 (AP 3)	Statistical Data Analysis using R	4	4	3	40	60	100
	IV	Skill Enhancement Course - 3 (SEC 3) ##	Naan Mudhalvan Course / SEC (List Enclosed)	2	2	3	30	70	100
		Interdisciplinary Course - 4 (IDC 4) \$\$	One Course from Outside Department	2	2	3	30	70	100
	TOTAL			30	26	-	-	-	800

V	III	Core Course - 5 (CC 5)	Design of Experiments	4	4	3	30	70	100
		Core Course - 6 (CC 6)	Statistical Inference - I	5	4	3	30	70	100
		Core Course - 7 (CC 7)	Sampling Theory	5	4	3	30	70	100
		Core Course - 8 (CC 8) (Any one)	1. Statistical Quality Control (or) 2. Official Statistics	5	4	3	30	70	100
		Core Practical - 5 (CP 5)	Statistics Practical - V	5	4	3	40	60	100
	IV	Skill Enhancement Course - 4 (SEC 4)	Any one from the List (List Enclosed)	2	2	3	30	70	100
		Skill Enhancement Course - 5 (SEC 5) ##	Naan Mudhalvan Course / SEC (List Enclosed)	2	2	3	30	70	100
		Introduction to Disaster Management		2	2	3	30	70	100
		Summer Internship / Industrial Activity @@	(with Viva-Voce)	-	2	-	20	80	100
	TOTAL			30	28	-	-	-	900
VI	III	Core Course - 9 (CC 9)	Statistical Inference - II	4	4	3	30	70	100
		Core Course - 10 (CC 10)	Operations Research	5	4	3	30	70	100
		Core Practical - 6 (CP 6)	Statistics Practical - VI	5	4	3	40	60	100
		Core Project Work	Project Work (with Viva- Voce)	6	4	3	20	80	100
	IV	Value Added Course	General Studies for Competitive Examinations	2	1	-	30	70	100
		Skill Enhancement Course - 6 (SEC 6)	Any one from the List (List Enclosed)	2	2	3	30	70	100
		Skill Enhancement Course - 7 (SEC 7) ##	Naan Mudhalvan Course / SEC (List Enclosed)	2	2	3	30	70	100
		Environmental Studies		2	2	3	30	70	100
		Gender Studies		2	1	3	30	70	100
		Extension Activities*		-	1	-	-	-	-
TOTAL			30	25	-	-	-	900	
GRAND TOTAL			180	150	-	-	-	4900	

List of Allied Courses: Mathematics

First Year	Second Year
1. Mathematics	1. Statistical Computation using R 2. Statistical Computation using Python (Practical) 3. Statistical Data Analysis using R (Practical)

SKILL ENHANCEMENT COURSE (SEC)			
Sl. No.	Title of paper	Sl. No.	MANDATORY Naan Mudhalvan Scheme ##
1.	Introduction to Machine Learning	1.	2nd Semester
2.	Introduction to Big Data Analytics	2.	3rd Semester
3.	Introduction to Data Science	3.	4th Semester
4.	Introduction to Biostatistics	4.	5th Semester
5.	Demography	5.	6th Semester
6.	Time Series and Index Numbers		
7.	Regression Analysis		

INTERDISCIPLINARY COURSE (IDC) FOR WHO HAVE OPT TAMIL AS PART-I (for other Department Students only)	
1st Semester	Quantitative Aptitude - I
2nd Semester	Quantitative Aptitude - II
3rd Semester	Statistics for Competitive Examinations - I
4th Semester	Statistics for Competitive Examinations - II

INTERDISCIPLINARY COURSE (IDC) # FOR WHO HAVE NOT OPT TAMIL AS PART-I		
Those who have studied Tamil up to 10 th + 2 but opt for other languages in degree	1st Semester	Special Tamil - I
	2nd Semester	Special Tamil - II
Those who have not studied Tamil in school level	1st Semester	Basic Tamil - I
	2nd Semester	Basic Tamil - II
Those students who opt for either special Tamil (or) Basic Tamil as IDCs, have to choose 2 more IDCs courses in their 3 rd and 4 th Semester from Outside his/her department.		

INTERDISCIPLINARY COURSE (IDC) \$\$ FOR NCC CADETS ONLY	
NCC Course is a Compulsory Course for the NCC Cadets in the 3rd Semester:	NCC Course is a Compulsory Course for the NCC Cadets in the 4th Semester:
Introduction to NCC	1. Special Subject Army (or) 2. Special Subject Navy (or) 3. Special Subject Air force
Those students who opt for NCC Courses as IDCs, have to choose 2 more IDCs courses in their 1st and 2nd Semester from Outside his/her department.	

Summary of Curriculum Structure of UG Programmes

Sl. No.	Part	Types of the Courses	No. of Course s	Credits for each Course	No. of Credits	Marks
1.	I	Ability Enhancement Course	4	3	12	400
2.	II	Ability Enhancement Course	4	3	12	400
3.	III	Core Course	10	4	40	1000
4.		Core Practical	6	4	24	600
5.		Allied Course (AC)	3	4	12	300
6.		Allied Practical (AP)	3	4	12	300
7.		Core Project Work (CPW)	1	4	4	100
8.	IV	Skill Enhancement Course (SEC)	7	2	14	700
9.		Interdisciplinary Course (IDC)	4	2	8	400
10.		Value Education	1	2	2	100
11.		Health and Wellness	1	1	1	100
12.		Introduction to Disaster Management	1	2	2	100
13.		Summer Internship / Industrial Activity	1	2	2	100
14.		Value Added Course	1	1	1	100
15.		Environmental Studies	1	2	2	100
16.		Gender Studies	1	1	1	100
17.		Extension Activities (NCC / NSS / Sports / Anti Drug Cell / YRC & Any Other Activities)	--	1	1	--
	Total		49	--	150	4900

- \$ For those who have studied Tamil upto 10th +2 (Regular Stream)
- + Syllabus for other Languages should be on par with Tamil at degree level
- # Those who have studied Tamil upto 10th +2 but opt for other languages in degree level under Part - I should study special Tamil and those who have not studied Tamil in the school level should study Basic Tamil in Part – IV under the Interdisciplinary Course.
- ** Examination at the end of the next semester
- ## Naan Mudhalvan Scheme: As per the Naan Mudhalvan Scheme instructions, 5 courses from 2nd to 6th semester should be studied under Skill Enhancement Course.
- \$\$ NCC Course is one of the Choices in the Interdisciplinary Course. Only the NCC Cadets are eligible to choose this course. However, NCC Course is a Compulsory Course for the NCC Cadets.

@ Health and Wellness: Assessments:

- Use self-reflective worksheets to assess their understanding
- submit the worksheets to internal audit / external audit
- Every student's activity report should be documented and the same have to be assessed by the Physical Director with Mentor. The evaluation should be for 100 marks. No examination is required.

Scheme of Evaluation:

Part	Description	Marks
A	Report	40
B	Attendance	20
C	Activities (Observation During Practice)	40
Total		100

@@ Summer Internship / Industrial Activity

Internship will be carried out during the summer vacation after the second year. Viva-Voce will be conducted by the college and Marks shall be sent to the University and the same will be included in the 5th semester Mark Statement.

Summer Internship / Industrial Activity & Project Work

Scheme of Evaluation:

Description	Marks
Report	80
Viva-Voce	20
Total	100

*

Extension Activities shall be outside instruction hours.

PROGRAMME OUTCOMES:

The Courses in the Department of Statistics will enable the student

- To develop the skills to analyze complex statistical data coming from the various fields like industry, marketing, finance, agriculture and business.
- To implement data analysis strategies to develop efficient models for various theoretical postulations.
- Understand the intricacies of statistical testing and its applications in real life problems.
- To develop, design and analyze experiments in empirical research.
- To develop soft skills and practicing professional ethics.
- Analyze every large data set in the context to real-world problems and interpret results using data analytics.
- Understand the optimization and computational techniques for the solution of the real-life problems.

COURSE OUTCOMES:

- Each course, in all the Programmes, has been designed and kept in accordance with the instructions of UGC and fulfills the requirements of the academic and industrial needs. By opt these courses students may be able to qualify the various esteemed competitive examinations like CSIR-NET, UGC-NET, GATE, ISS, IAS, PCS and many others.
- These programmes offered by the department are highly employable and enable the students to take positions in various Institutes / Universities/ Industries for research and development and serve the society.

PROGRAM SPECIFIC OUTCOME:

- The courses in the Department are designed to in calculate analytic and decision-making aptitude among the students. Having an advanced and upgraded knowledge of Statistics from both the theoretical and practical aspects, the students who pass out are well equipped in managing and analyzing various types of data. The education imparted in Statistics is aimed to inculcate statistical thinking in young minds for better future planning and welfare of society and to contribute to the society through excellence in statistical education and research.
- Students after completing these courses may be able to start their career with various Academia and Industry Interface. It may provide a platform to all the students to get experiential learning in this material world. The students may also able to develop decision making problems and suggest the best solution to attain the decision in R&D sector jobs.

PO1	Communication Skill: Mandatory language courses facilitate to become proficient in communication, culturally aware, and more employable in both Indian and global contexts. Improve presentations skill, debates, and professional communication.
PO2	Disciplinary Knowledge: Learn in-depth complex scientific concepts, demonstrate their ability to explain and apply their knowledge. Consistent in learning by earning extra credits in specialized courses within the science domain and enhance disciplinary knowledge.
PO3	Critical thinking: Field and academic visits will help students to develop observation skills, grasping ability, collect and interpret data and propose models that will help them to understand hypotheses and conclusions.
PO4	Analytical Reasoning: Through interactions, students will develop skills of critical reading of texts, identifying gaps in knowledge, formulating scientific questions, and on will recognizing the synthesis of new ideas.
PO5	Scientific Reasoning: Skill oriented courses will provide details on principles, conduct of proper calibration and use of scientific instrumentation and appropriate use of scientific techniques in experimental design.
PO6	Self-directed Learning: Preparation of field reports helps them to present their results and discussion in a written format that is typically required for their future professions.
PO7	Reflective Thinking: All core courses with laboratory components will provide exposure to a wide range of research techniques, therein enhancing their understanding of the application of techniques in their domain.
PO8	Problem Solving: Students will develop the ability to reason, apply numerical concepts, and equations in their fields of study for interpreting scientific data and drawing relevant scientific conclusions.
PO9	Research-related Skills: Students undertaking a internship will have the opportunity to design, develop and execute their own research ideas in their experiments, thus expanding their knowledge of research methods and laboratory skills.
PO10	Lifelong Learning: Ability to understand the gaps in knowledge and skill, adapt to technological change, engage in self-directed learning.

First Year	Core Course 1	Semester I
Code:	DESCRIPTIVE STATISTICS (Theory)	Credits: 4
COURSE OBJECTIVES:		
The learning objectives include: - To summarize the data and to obtain its salient features from the vast mass of actual data. - To visualize the data through graphical and diagrammatic representations. - To analyze univariate and bivariate data. - To understand the concept of comparative analysis and linearity.		
UNIT-I: Introduction to Statistics Meaning - Definition - Importance - Scope - Functions - Limitations. UNIT-II: Diagrammatic and Graphical Representation Diagrammatic representations of data - Bar diagrams, Simple, Component, Multiple and Percentage, Pie diagrams. Graphical representations - Histogram, Frequency Curve, Frequency Polygon and Ogives (Construction and Uses). UNIT-III: Measures of Central Tendency Measures of Central Tendency - Arithmetic Mean, Median, Mode, Geometric Mean and Harmonic Mean - Derivation of their properties, Merits and Demerits and Problems. UNIT-IV: Measures of Dispersion Measures of dispersion - Range, Quartile deviation, Mean deviation, Standard deviation and Coefficient of variation. Skewness - Concept, Measures of skewness - Karl Pearson's and Bowley's coefficient of skewness. Moments - Raw and Central. Kurtosis - Concept and Measures of Kurtosis and Problems. UNIT-V: Correlation and Regression Correlation - Definitions, Types and Properties of Correlation Coefficient (Statement and Proof). Scatter diagrams, Karl Pearson's co-efficient of correlation and Spearman's rank correlation. Regression lines and its properties - Uses and Problems. UNIT-VI: Current Contours (For Continuous Internal Assessment Only) Case study and Problems relating to all the above units. Expert lectures, Seminars - Webinars.		
REFERENCES:		
- Gupta S.C. and Kapoor V.K. (2013), Fundamentals of Mathematical Statistics. Sultan Chand & Sons, New Delhi. - Gupta S.P. (1995), Statistical Methods, Sultan Chand & Sons, New Delhi.		

COURSE OUTCOMES:

On the successful completion of the course, students will be able to,

C01: Concepts of statistical population and sample, variables and attributes.

C02: Tabular and graphical representation of data based on variables.

C03: Conditions for the consistency and criteria for the independence of data based on attributes.

C04: Measures of central tendency, dispersion, skewness and kurtosis.

C05: Moments and their use in studying various characteristics of data.

Course Outcomes	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10
C01	1	3	2	3	1	1	1	3	1	2
C02	1	3	3	3	2	1	1	3	2	2
C03	1	3	3	3	2	1	2	3	2	2
C04	1	3	3	3	2	1	2	3	2	2
C05	1	3	3	3	2	1	2	3	2	3

First Year	Core Practical 1	Semester I
Code:	STATISTICS PRACTICAL - I (Practical)	Credits: 4
COURSE OBJECTIVES:		
The learning objectives include: • Definition and scope of Statistics, concepts of statistical population and sample. • Quantitative and qualitative data in attributes, variables, • Scale of measurements in nominal, ordinal, interval and ratio. • Tabular and graphical presentation on histogram and ogives. • Calculation of the quartile, mean and standard deviations, skewness and correlation.		
PRACTICAL PROBLEMS:		
• Diagrammatic representations of data: Bar diagrams, Simple, Component, Multiple and percentage, Pie diagrams. • Graphical representations: Histogram, Frequency Curve, Frequency Polygon and Ogives. • Measures of Central Tendency: Arithmetic Mean, Median, Mode, Geometric Mean and Harmonic Mean for raw and grouped data. • Measures of Dispersion: Quartile, Mean and Standard Deviations and their coefficients. • Measures of Skewness: Karl Pearson's and Bowley's coefficient of skewness. • Measures of Kurtosis: Calculation of measures of kurtosis. • Calculation of Coefficient of Correlation: Karl Pearson's and Spearman's Rank. • Finding the two regression equations X on Y and Y on X, and estimating unknown values of X and Y.		
REFERENCES:		
1. Gupta S.C. and Kapoor V.K. (2013), Fundamentals of Mathematical Statistics. Sultan Chand & Sons, New Delhi. 2. Gupta S.P. (1995), Statistical Methods, Sultan Chand & Sons, New Delhi.		

COURSE OUTCOMES:

Upon successful completion of this course the students would be able:

CO1: Tabular and graphical representation of data based on variables.

CO2: Conditions for the consistency and criteria for the independence of data based on attribute.

CO3: Measure of central tendency, dispersion, skewness and kurtosis.

CO4: Moments and their use in studying various characteristics of data.

CO5: Calculate the quartile, mean and standard deviations, skewness and correlation.

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	1	3	2	3	1	1	1	3	1	2
CO2	1	3	3	3	2	1	1	3	2	2
CO3	1	3	3	3	2	1	2	3	2	2
CO4	1	3	3	3	2	1	2	3	2	2
CO5	1	3	3	3	2	1	2	3	2	3