



**MAR IVANIOS COLLEGE (AUTONOMOUS)  
THIRUVANANTHAPURAM**

**SCHEME & SYLLABUS  
FOR  
CERTIFICATE COURSE IN STATISTICAL METHODS**

**(2019 ADMISSION ONWARDS)**

## CERTIFICATE COURSE IN STATISTICAL METHODS

### **Background:**

Observations from public surveys, social life, industry/commerce, biological laboratory experiments, clinical trials, and health surveys always carry some amount of uncertainty. In many cases, especially for the laboratory experiments, it is inevitable to just ignore this uncertainty due to large variation in observations. Tools from statistics are very useful in analysing this uncertainty and filtering noise from data. In the case of biological/medical experiments, due to advancement of microscopy and molecular tools, a rich data can be generated from experiments. To make sense of this data, we need to integrate this data a model using tools from statistics.

### **Course Outcome (COs):**

At the end of the course, the students will learn statistical techniques needed to

- (i)analyse and interpret statistical data and observations,
- (ii)design new experiments which open avenues of further research,
- (iii) integrate large number of observations in single unified model.

### **SYLLABUS**

**Module 1:** Introduction to the course, Data representation and plotting, Arithmetic mean, Geometric mean, Measure of variability, Standard deviation.

**Module 2:** Correlation and Regression

**Module 3:** Concept of Probability: introduction and basics, counting principle, Permutations, and Combinations, Random variables, Probability mass function, and Probability density function, Expectation, Variance.

**Module 4:** Binomial random variables, Probability distribution: Poisson distribution and Uniform distribution, Normal distribution and Exponential distribution.

**Module 5:** Sampling distributions, Sampling distributions of sample mean, Estimation, Confidence interval. Testing of Hypothesis, 1 tailed and 2 tailed test, t-distribution, Chi-square test

**Module 6:** Some Practical Sheets using Excel

1. Classification and Tabulation
2. Central tendency
3. Dispersion measures
4. Correlation and Regression
5. Discrete Probability Distributions
6. Normal Distribution
7. Estimation
8. Tests based on Normal Distribution
9. Tests based on t- distribution
10. Tests based on Chi-square distribution

**Text Book:** S. P. Gupta, Statistical Methods, Sultan Chand & Sons, New Delhi, 2012.

**References:**

1. I. Miller and M. Miller, John E. Freund's Mathematical Statistics with Applications, Pearson Education India, 2013.
2. W.J. Evens and G.R. Grant, Statistical Methods in Bioinformatics: An Introduction (Statistics for Biology and Health), Springer, 2010.

**Eligibility:** Students who have qualified Plus II or UG Degree of any discipline are eligible to join this course.

**Evaluation:**

The evaluation of the course will be as per the following criteria:

Component	Marks
Assignment (1)	10 marks
Case Study (1)	10 marks
Course End Examination	80 marks
Total	100 marks

**Pass Criteria and Grades:**

Students who have not less than 75% attendance will be eligible to appear for the Course End Examination. Any student who secures at least 50% aggregate marks in the evaluation will be eligible to awarded 'Certificate in Statistical Methods'.

The grading of the course will be as follows:

Marks (%)	Grade	Performance
≥ 90%	A+	Outstanding
≥80 to <90	A	Excellent
≥70 to <80	B+	Very Good
≥60 to <70	B	Good
≥50 to <60	C	Satisfactory
Less than 50	F	Failed

**Duration of the course:**

40 hours

**Intake:**

Preferably 40 students, with a marginal increase of 20% in case of necessity.

**Fee Structure:**

Course Fee: Rs. 2000

Exam Fee: Rs. 300 (Registration + Examination + Certificate)