ATMIYA UNIVERSITY

FACULTY OF SCIENCE
DEPARTMENT OF COMPUTER APPLICATIONS
MASTER OF COMPUTER APPLICATIONS

Course Code	Course Name	Credits
20MCACC201	**Statistical Methods**	**05**

❖ Aim of the Course:

Statistics is used for data mining, speech recognition, vision and image analysis, data compression, artificial intelligence, and network and traffic modeling. A statistical background is essential for understanding algorithms and statistical properties that form the backbone of computer science

❖ Course Overview and Context:

The course is divided into five units. The first units deal with basic statistics which works as a pre-requisite for other four units. Unit-2 designed to learn concepts of probability and its usefulness in real life. Unit-3 and unit-4 are related to some special discrete and continuous distributions which are highly useful to solve many real-life applications. Unit-5 is an introductory unit for hypothesis testing which a path breaking concepts related to research in analysis.

❖ Course Outcomes:

Sr #	Course Outcome	Cognitive Level
1	To **recall** basic concepts of statistics	Remember
2	To **understand** the concept of probability and their need in real life.	Understand
3	To **translate** the real-life situations in mathematical form and **solve** them using some discrete probability distributions.	Understand, Apply
4	To **translate** the real-life situations in mathematical form and **solve** them using some continuous probability distributions.	Understand, Apply
5	To **understand** the real-life statistical problem and to **solve** it using concepts of hypothesis testing and to give generalized conclusion of the same.	Understand, Apply

Hint*

Sr#	Keyword	Action Verb
1	Remember	Recognize, **recall**, list, tell, locate, write, find, mention, state, draw, label, define, name.
2	Understand	**Translate**, Paraphrase, Represent, Clarify, Illustrate, Instantiate, Categorize, Subsume, Generalize, Abstract, find a pattern, Extrapolate, Predict, Contrast, Match, Distinguish, Differentiate, construct a model, Explain
3	Apply	determine, calculate, compute, estimate, **solve**, draw, modify, etc.
4	Analyze	discriminate, select, focus, distinguish, structure, integrate, find coherence, outline, parse, Deconstruct
5	Evaluate	Test, detect, monitor, coordinate, Judge (accuracy, adequacy, appropriateness, clarity, cohesiveness, completeness, correctness, reasonableness, reliability, validity)
6	Create	Develop alternative hypotheses, theories, explanations, Plan, Design, Construct

❖ Content of the Course:

Unit-1 Basic Statistics

- ➢ Mean, Median, Mode
- ➢ Percentiles, Quartiles;
- ➢ Inter-quartile Range, Variance, Standard Deviation, Coefficient of Variation;
- ➢ Exploratory Data Analysis; Weighted Mean & working with Grouped Data
- ➢ Graph and Charts

Unit-2 Probability and Probability Laws

- ➢ Random Experiment, Sample Space and Events
- ➢ Classical Definition of Probability
- ➢ Probability Laws: Union, Intersection, Difference and Symmetric Difference
- ➢ Conditional Probability
- ➢ Bayes' Theorem

Unit-3 Some Special Discrete Probability Distributions

- ➢ Random Variable and its spaces
- ➢ Types of Random Variables
- ➢ Bernoulli's Distribution
- ➢ Binomial Distribution
- ➢ Geometric Distribution
- ➢ Negative Binomial Distribution
- ➢ Poisson Distribution
- ➢ Hypergeometric Distribution

Unit-4 Some Special Continuous Distributions

- ➢ Uniform Distribution
- ➢ Normal Distribution
- ➢ Approximation Binomial Probabilities using Normal Distribution
- ➢ Approximation Poisson Probabilities using Normal Distribution
- ➢ Uniform Distribution
- ➢ Exponential Distribution

Unit-5 Statistical Inference-Testing of Hypothesis

- ➢ Introduction
- ➢ Types of Hypothesis
- ➢ Rejection and Non-Rejection areas
- ➢ Level of Significance
- ➢ Testing of Hypothesis for a single mean (Large Sample) (z-test)
- ➢ Testing of Hypothesis for a single mean (Small Sample) (t-test)
- ➢ Testing of Hypothesis for a single proportion (z-test)

❖ Learning Resources:

Sr #	Textbook | References | Internet Links
1	J.Susan Milton & Jesse Arnold, "Introduction to Probability & Statistics: Principles & Applications for Engineering & Computing Sciences"
2	Bharat Jhunjhunwala, "Business Statistics", first edition, S Chand, 2008
3	Richard Levin, David Rubin, "Statistics for Management", 7th edition, PHI
4	Nabendu Pal, Sahadeb Sarkar, "Statistics-Concepts and Applications", 2nd edition, PHI

❖ Assignments (Optional):

Sr #	Description	Available From (Date)	Submission Date
1	Probability and Probability Distribution	After 3 Weeks	Within 10 Days
2	Hypothesis testing and their applications	After 6 Weeks	Within 7 Days