



# AMITY UNIVERSITY

— UTTAR PRADESH —

**COURSE TITLE: COMPUTER ORIENTED STATISTICAL AND OPTIMIZATION METHODS**

**Course Level: UG**

**Credit Units : 04**

**Course Code : CSIT202**

L	T	P/ S	SW/F W	TOTAL CREDIT UNITS
3	-	2	-	4

**Course Objective:**

The objective of this course is to:

1. expose students to the fundamentals and concepts of statistical and optimization methods, in particular, with reference to frequency distribution and measures of central tendency, measures of dispersion, skewness and kurtosis, theory of probability, linear programming problems, transportation, assignment and game problems.
2. Help the students to understand important theorems, different formulae and practical applications of these statistical and optimization methods in the field of Computer Sciences and Applications.

**Pre-requisites:**

Mathematics of 12th standards

**Course Contents/Syllabus:**

	Weightage (%)
<b>Module I</b>	<b>20</b>
Collection of Data, Sampling and Sampling Designs, Classification and Tabulation of Data, Graphical representation of Data, Measures of Central Value, Measures of Dispersion. Moments, Skewness,	

Kurtosis, Correlation and Regression.	
<b>Module II: Probability</b>	
Classical Definition of Probability, Algebra of Events, Probability Axioms, Conditional Probability. <b>Probability Distributions:</b> Discrete and Continuous Distributions, Binomial Distribution, Poisson distribution, Normal Distribution.	<b>20</b>
<b>Module III: Linear Programming</b>	
Mathematical Formulation of Linear Programming models and its Graphical Solutions, Simplex Method, Charne's Big M method, Two Phase Method.	<b>20</b>
<b>Module IV: Transportation Problem</b>	
General Transportation model, Starting basic Solutions:-North west Corner Method, Least Cost Method, Vogel's Approximation Method, Test of optimality, unbalanced Problem, Assignment Problems	<b>20</b>
<b>Module V: Game Theory</b>	
Two-Person Zero Sum Games, Maximin-Minimax Principal, Pure Strategies, Mixed Strategies, Expected Pay off, Concept of Dominance, Graphical n Games. □ 2 and 2 □Solution of m	<b>20</b>

**Student Learning Outcomes:**

The student will be able:

- To learn statistical and optimization methods, in particular, with reference to frequency distribution and measures of central tendency, measures of dispersion, skewness and kurtosis,
- To learn theory of probability, linear programming problems, transportation, assignment and game problems.
- To learn important theorems, different formulae and practical applications of these statistical and optimization methods in the field of Computer Sciences and Applications.

**Pedagogy for Course Delivery:**

The class will be taught using theory and case based method. In addition to assigning the case studies, the course instructor will spend considerable time in understanding the concept of innovation through the eyes of the consumer. The instructor will cover the ways to think innovatively liberally using thinking techniques.

**List of Experiments:**

1. Write a program to find mean, median and mode.
2. Write a program to evaluate measure of dispersion.
3. Write a program to find skewness.
4. Write a program to find Kurtosis.
5. Write a program to find regression line of y on x from any given set of points.
6. Write a program to find regression line of x on y from any given set of points.
7. Write a program to find the solution of linear equations using Simplex Method
8. Write a program to find the solution of linear equations using Big M Method
9. Write a program to find the solution of Transportation problem using North-West corner Method.
10. Write a program to find the solution of Transportation problem using Least Cost Method
11. Write a program to find the solution of Transportation problem using Vogel's Method

**Assessment/ Examination Scheme:**

<b>Theory L/T (%)</b>	<b>Lab/Practical/Studio (%)</b>	<b>Total (%)</b>
<b>75</b>	<b>25</b>	<b>100</b>

**Theory Assessment (L&T):**

<b>Continuous Assessment/Internal Assessment</b>					<b>End Term Examination</b>
<b>Components (Drop down)</b>	<b>Mid-Term Exam</b>	<b>Assignment</b>	<b>Project</b>	<b>Attendance</b>	
<b>Weightage (%)</b>	10	5	10	5	70

**Text & References:*****Text:***

- P.K. Gupta & Manmohan, Linear Programming and Theory of Games, S. Chand, 1997.
- S.C Gupta & V.K. Kapoor, Fundamentals of Mathematical Statistics, S. Chand., 2000.

***References:***

- Hogg, Probability and Statistical Inference, Pearson, 5<sup>th</sup> Edition.
- Alexander. M. Mood, Introduction to the Theory of Statistics” McGrawHill, 3<sup>rd</sup> Edition
- Taha, Handy A , Operations Research, 1997.
- G. Hadley, Linear Programming, 1963.