

NIRMA UNIVERSITY
Institute of Technology
B.Tech. in Computer Science and Engineering
Semester VI
Department Elective-I

L	T	P	C
2	0	2	3

Course Code	2CSDE52
Course Title	Optimization Techniques

Course Outcomes:

At the end of the course, students will be able to –

1. relate key concepts and applications of various optimization techniques
2. identify the appropriate optimization technique for the given problem
3. formulate appropriate objective functions and constraints to solve real life optimization problems.

Syllabus

**Teaching
Hours: 30**

Unit I

02

Introduction: Historical Development, Engineering applications of optimization, Statement of an optimization problem, Classification of optimization problems

Unit II

05

Classical Optimization Techniques: Single variable optimization, Constrained and unconstrained multivariable optimization, Relevant applications

Unit III

06

Linear Programming: Standard form of a linear programming problem, Simplex method, Duality in linear programming, Quadratic programming, Stochastic linear programming, Relevant applications

Unit IV

04

Nonlinear Programming: Unimodal function, Interpolation methods, Direct and indirect methods, Relevant applications

Unit V

05

Geometric Programming: Unconstrained and constrained geometric programming problems, Geometric programming with mixed inequality

Unit VI

04

Integer Programming: Integer linear programming, Integer nonlinear programming, Relevant applications



Unit VII **02**
Game Theory: Introduction, Characteristics of Game Theory, Two Person,
Zero sum games, Pure strategy. Dominance theory

Unit VIII **02**
Genetic Algorithms: Introduction, Representation methods, Selection methods,
Operators, Replacement methods, Relevant applications

Self Study:

The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

Laboratory Work:

Laboratory work will be based on the above syllabus with minimum 10 experiments to be incorporated.

Suggested Readings[^]:

1. Rao, S. S., & Rao, S. S., Engineering optimization: theory and practice. John Wiley & Sons.
2. Hadley, G., Linear programming, Narosa Publishing house.
3. Taha, H. A., Operations research: An introduction. Pearson Education India.
4. Deb, K, Optimization for engineering design: Algorithms and examples. PHI Learning Pvt. Ltd.
5. Kumar, D. N., Multicriterion analysis in engineering and management. PHI Learning Pvt. Ltd.

L=Lecture, T=Tutorial, P=Practical, C=Credit

[^]this is not an exhaustive list