OPTIMIZATION TECHNIQUES

III Semester: CSE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
BCSC28	Elective	3	0	0	3	30	70	100
Contact Classes: 45	Total Tutorials: Nil	Total Practical Classes: Nil				Total Classes: 45		

I. COURSE OVERVIEW:

This course is used to maintain a balance between theory, numerical computation, and problem setup for solution by optimization software. The course covers the basic methods of optimization techniques, design algorithms, establish their correctness, study their efficiency and memory needs. Optimization techniques are used in real life problems and their mathematical formulation as standard programming problems.

II. COURSE OBJECTIVES:

The students will try to learn:

I. The linear programming problem with approximate solutions.
II. How to optimize these mathematical problems using nature based algorithms.
III. The dynamic programming and quadratic approximation to electrical and electronic problems and applications.
IV. The appropriate technique to solve Game problem.

III. COURSE OUTCOMES:

After successful completion of the course, students will be able to:

CO 1	**Make** use of recursive algorithm design technique in appropriate contexts.	Create
CO 2	**Calculate** and implement linked lists, stacks and queues in Python	Apply
CO 3	**Choose** linear programming using Approximation and Randomized algorithm	Evaluate
CO 4	**Design** flow-networks and matrix computation using Strassen's algorithm	Apply
CO 5	**Describe** the variable metric methods for constrained optimization**.**	Knowledge

IV. SYLLABUS

MODULE-I: ENGINEERING APPLICATION OF OPTIMIZATION (09)

Engineering application of optimization, formulation of design problems as mathematical programming problems.

MODULE-II: GENERAL STRUCTURE OF OPTIMIZATION (09)

General Structure of Optimization Algorithms, Constraints, The Feasible Region.

MODULE-III: BRANCHES OF MATHEMATICAL PROGRAMMING (09)

Branches of Mathematical Programming: Optimization using calculus, Graphical Optimization, Linear Programming, Quadratic Programming, Integer Programming, Semi Definite Programming

MODULE-IV: OPTIMIZATION ALGORITHMS (09)

Optimization Algorithms like Genetic Optimization, Particle Swarm Optimization, Ant Colony Optimization etc.

MODULE-V: REAL LIFE PROBLEMS (09)

Real life Problems and their mathematical formulation as standard programming problems.

V. TEXT BOOKS:

1. Laurence A. Wolsey, "Integer Programming". Wiley. ISBN978-0-471-28366-9, 1998.
2. AndreasAntoniou, "Practical Optimization Algorithms and Engineering Applications", Springer, 2007.

3. Edwin K., P. Chong & Stanislaw h.Zak, “An Introduction to Optimization”, Wiley-Inter science, 1996.

VI. REFERENCE BOOKS:

1. Dimitris Bertsimas; Robert Weismantel, “Optimization Over Integers”. Dynamic Ideas. ISBN 978-0-9759146-2-5, 2005.
2. John K. Karlof, “Integer programming: theory and practice”. CRC Press. ISBN 978-0-8493- 1914-3, 2006.
3. H. Paul Williams,” Logic and Integer Programming”. Springer. ISBN978-0-387-92279-9, 2009.

VII. WEB REFERENCES:

1. http://www.sctie.iitkgp.ernet.in/
2. http://www.rkala.in/softcomputingvideos.php
3. http://www.sharbani.org/home2/soft-computing-
4. http://www.myreaders.info/html/soft_computing.html

VIII. E-TEXT BOOKS:

1. https://www.books.google.co.in/books?id=bVbj9nhvHd4C
2. https://www.books.google.co.in/books?id=GrZHPgAACAAJ&dq=1.+J.S.R.Jang,+C.T.Sun+and+E.Mizutani,+Neuro,+Fuzzy+and+Soft+Computing,+PHI,+2004,Pearson+Education.