

Subject Code: 1ET2060205	Subject Title: STRUCTURAL OPTIMIZATION (Elective - III)
Pre-requisite Subject	--

Course Objective:

The basic requirement of an efficient structural design is that the response of the structure should be acceptable as per various specifications, i.e., it should at least be a feasible design. There can be large number of feasible designs, but it is desirable to choose the best from these several designs. The best design, optimal design, could be in terms of minimum cost, minimum weight or maximum performance or a combination of these. Thus, optimization techniques play an important role in structural design. The purpose of optimization is to find the best solutions from which a designer can derive a maximum benefit from the available resources.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	2	-	5	60	40	-	20	120

Subject Contents				
Sr. No	Topic	Total Hours	Weight (%)	
01	Introduction to optimization, optimization techniques for unconstrained and constrained optimization problems	08	20	
02	Classical Optimization, Lagrange Multiplier technique and Kuhn – Tucker conditions	08	20	
03	Solution of NLP by direct methods and by series of unconstrained optimization problems, formulation of different types of structural optimization problems.	08	20	
04	Computation of derivatives of response quantities with respect to design variables.	08	15	
05	Minimum weight design of trusses, frame, etc.	08	20	
06	Introduction Genetic Algorithm	02	5	

List of References:

1. Optimization theory & application S. S. Rao
2. Structural optimization Majid
3. Advanced mathematics Kreysig
4. Numerical analysis Scarborough
5. Optimum Structural optimization Marris
6. Optimum Structural Design Spunt
7. Optimum Structural Design Uri Krisch

Course Outcome:

After learning the course, the students should be able to:

1. understand optimization techniques,
2. classify the optimization problems,
3. derive response quantities corresponding to design variable,
4. apply optimization techniques to trusses, beams and frames.



Sankalchand Patel University
Faculty of Engineering and Technology
First Year Master of Technology in Civil Engineering
(Structural Engineering)
In Effect from Academic Year 2017-18

List of Open Source Software/learning website:

<http://nptel.ac.in/>

<http://ocw.mit.edu/courses/civil-and-environmental-engineering/>