Optimization Methods for Engineering Planning and Design

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Overview

Optimization is a powerful technique to obtain the best possible solution of various engineering planning and design problems. The techniques are in extensive use in engineering planning and design since long back. However, with the availability of high-end computing facilities, it becomes more and more popular and is an important tool for finding the cost effective solution of various engineering problems. The current optimization methods and tools are sufficiently mature to be applied in industrial applications. As such, the applications of optimization techniques are increasing day by day in all branches of engineering and technology. The objective of the course is to present the classical and non-classical optimization methods used in engineering planning and design problems. It will address some of the common real-world problems in engineering design and planning of different engineering disciplines vis-à-vis Civil Engineering, Mechanical Engineering, etc. The initial lectures will cover the basics of the engineering optimization problems with their classical solution techniques and finally focuses will be given on the recent development in stochastic optimization techniques such as Evolutionary Optimization, Simulated Annealing, Particle Swarm Optimization, Differential Evolution, Direct Search methods, etc. It is intended to describe the systematic approach of optimization, which includes problem definition, its mathematical formulation, selection of a suitable optimization method, and a detailed analysis of the obtained optimal solution(s). Emphasis will also be given to enable the participants to formulate and optimize engineering problems with minimal programming skills. Practical works and projects will deal with optimal dimensioning of technical objects using MATLAB software.

Duration	**May 2 – May 6, 2016**
Modules	**This course will cover following topics:** **Formulation of Optimization Problem** **Classical optimization methods** **Stochastic optimization method: Genetic Algorithms, Simulated Annealing, Differential Evolution, Particle Swarm Optimization** **Multi-objective optimization: Classical approach, Evolutionary Computation** **Layout Optimization: Architectural layout problem, industrial facility layout problem** **Solution of industrial planning and packing problem** **Solution of Groundwater management problem** **Number of participants for the course will be limited to fifty. Apply early for a secured position in the course.**
You Should Attend If…	▪ you are an engineer or research scientist interested in using optimization methods for engineering planning and design. ▪ you are a student or faculty from academic institution interested in learning optimization methods for engineering planning and design.
Fees	The participation fees for taking the course is as follows: **Participants from abroad : USD 200** **Industry/ Research Organizations: INR 10,000** **Faculty Members/Researchers from Academic Institutions/ Research Organizations: INR 5,000** **Students from Academic Institutions: INR 1,000** **(Student registration is refundable subject to participation)** The above fee include all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr free internet facility. The participants will be provided accommodation inside the campus on payment basis.

The Faculty

Prof. Fouad Bennis is Professor in Mechanical Engineering at the Ecole Centrale de Nantes, France. His research covers various activities in the fields of Multi-Disciplinary Optimization of product and process design. His domain of competencies concerns the Analyze and synthesis of mechanical tolerances, robust design, fuzzy design, collaborative design, optimization and decision-making. More information about his research contribution can be found from http://www.irccyn.ec-nantes.fr/~bennis/Index.html

Prof. Rajib Kumar Bhattacharjya is a Professor at Indian Institute of Guwahati, Guwahati. His research interest is Application of classical and non-classical optimization methods, Groundwater management models, Artificial Neural Networks. More information about his research contribution can be found from www.iitg.ernet.in/rkbc

Course Co-ordinator

Prof. Rajib Kumar Bhattacharjya
Phone: +91-361-2582428
E-mail: rkbc@iitg.ernet.in
Web: www.iitg.ernet.in/rkbc

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