



Suez Canal University
Faculty of Petroleum and Mining Engineering
Control Technology Unit (CTU)



Institute of Electrical and
Electronics Engineers (IEEE)
Robotics & Automation Society
Egypt Chapter

Optimization with Engineering Applications

Free Intensive Course

Optimization techniques are search methods, where the goal is to find a solution to an optimization problem, such that a given quantity is optimized, possibly subject to a set of constraints. This course provides a comprehensive introduction to modern optimization techniques and highlights the power of these computational techniques in solving complex engineering problems. The course is a free intensive training course offered by Control Technology Unit (CTU) of Faculty of Petroleum and Mining Engineering in collaboration with IEEE Robotics and Automation Society – Egypt Chapter (<http://www.ras-egypt.org/>). This is a lecture-project course in which topics are presented by the instructor and a course project is completed by students. The course project is integrated as an essential part of the course where each student applies one of the explained optimization techniques to solve problem in his/her area of interest. Certificates will be issued by Control Technology Unit (CTU) of Faculty of Petroleum and Mining Engineering and IEEE Robotics and Automation Society – Egypt Chapter.

Grading Policy: Total grade= Attendance (40%) + Project (60%)

Course Schedule:

Monday November 5, 2012: Optimization Theory

- Introduction to Optimization
- Optimization and Operations Research
- Optimization Problem Classifications
- Optimization Methods
- Numerical Methods

Monday November 12, 2012: Deterministic Optimization

- Blind Search Methods
- Informed Search methods

Monday November 19, 2012: Trajectory-based Stochastic Optimization

- Tabu Search
- Simulated Annealing

Monday November 26, 2012: Trajectory-based Stochastic Optimization

- Evolutionary Computation
- Genetic Algorithms

Monday November 3, 2012: Population-based Stochastic Optimization

- Swarm Intelligence
- Particle Swarm Optimization
- Ant Colony Optimization

Monday December 17, 2012: Project Presentation and Discussion

Venue: All the lectures will be given in the Control Lab, 4th Floor (Elevator side) in Faculty of Petroleum and Mining Engineering

Time: All the lectures will be on Mondays from 12:30 to 3:00PM

Instructor: Dr. Alaa Khamis, <http://www.alaakhamis.org/> **Contact Information:** Email: ctu.suez@gmail.com