

-(Division ) Aerospace Engineering : (Department)  
graduate students of Aerospace Engineering: (Level and Major)

---

Number of Credits :۳

Course Title :Optimization methods

Lecturer : Dr. Ali Madadi

Prerequisite : -

---

### Course Description

In this course, the students learn how to deal with an optimization problem, select the proper optimization algorithm and apply to problems in engineering.

### Course Goals and Objectives

Being familiar with classic and modern optimization methods

### Course Topics

- Introduction to Optimization
- One-Dimensional Search Methods
- Unconstrained optimization
- Simplex Method
- Gradient methods
- Constrained Optimization
- Artificial Neural Networks
- Genetic Algorithm
- Ant colony optimization
- Particle swarm optimization
- Design of experiments

The course aims to

The student can select the optimization algorithm, check the convergency, and improve the performance of optimization algorithms.

### Reading Resources

Rao, Engineering optimization : theory and practice, John Wiley & Sons, 4th ed., 2009.  
Rao and Savsani, Mechanical Design Optimization Using Advanced Optimization Techniques, Springer, 2012  
Andreas Antoniou, Wu-Sheng Lu, Practical Optimization: Algorithms and Engineering Applications, Springer, 2007.  
Edwin K.P. Chong, Stanislaw H. Zak, an Introduction to Optimization, John Wiley & Sons, 2001.

### Evaluation

Exercises 35%  
Projects 35%  
Presentation 10%  
Final exam 20%