

**Aerospace Engineering**                      **Division:**  
**Level and Major: Graduate, Aerospace Eng**

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**Course Title: Optimization Methods**  
**Lecturer: Dr. Ali Madadi**

**Number of Credits: 3**

**Prerequisite**

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**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

**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:**

1· % Presentation, 20% Final Exam, 35% Homework, 35% Project