

# MA 557- Optimization Theory

<b>Course Code:</b>	MA-557
<b>UTAA Credit (Theoretical-Laboratory hours/week):</b>	3(3-0)
<b>ECTS Credit:</b>	6.0
<b>Department:</b>	Mechanical and Aeronautical Engineering
<b>Language of Instruction:</b>	English
<b>Level of Study:</b>	Graduate
<b>Offered Semester:</b>	Fall and Spring Semesters.

## Course Objectives

To teach optimization techniques used in engineering. To teach fundamental optimization theories. To gain the ability of application of optimization techniques to engineering problems

## Course Content

Linear programming methods. Simplex method. Duality. Unconstrained optimization. Ordinary minimum problems with constraints. The classical multiplier method, descent methods, and quasi-Newton methods. Second order necessary conditions. Continuous gradient methods, conjugate gradients. Nonlinear programming. Optimum design concepts. Using and developing codes for the solution of optimization problem

## Course Learning Outcomes

- 1-Basic linear and nonlinear optimization techniques
- 2-Formulation and solution of optimization problems
- 3-Application of optimization techniques to engineering problems
- 4-Problem solving with numerical optimization methods