Form (H)
Short course description

Course title: **Nonlinear Optimization**	Course number and code: **OPER 331**
Previous course requirement: **MATH 201 – OPER 213**	Language of the course: **English**
Course level: **level 6**	Effective hours: **4 (3+2+0)**

Course description

Review of Convex Analysis and Matrix algebra. Basics concepts of optimization and classification of optimization problems. Optimality conditions for unconstrained optimization problems of one variable and many variables. Constrained optimization problems : Graphical solution - Optimality conditions - Lagrangian technique – Kuhn Tucker conditions and their application to Quadratic program. One dimensional and multi-dimensional search techniques for unconstrained optimization problems. Gradient Projection, Feasible direction, and Penalty barrier function Methods : Algorithms and solution procedures with applications.

Course objectives

Introduce students to the basic elements of Optimization Theory and its applications. Learn the use of optimality conditions of unconstrained and constrained optimization problems. Ability to apply analytic and numerical methods to solve non-linear optimization problems. Use of computer software to solve nonlinear optimization problems.

Learning outcomes (understanding, knowledge, and intellectual and scientific skills)
After studying this course, the student is expected to be able to:

1. *Learn basic knowledge of Optimization Theory and its applications.*
2. *Ability to apply optimality conditions of unconstrained and constrained optimization problems to find the stationary points and determine their kind.*
3. *Ability to solve non-linear optimization problems (constrained and unconstrained models) using numerical techniques.*

Textbook adopted and supporting references

Title of the book	Author's name	Publisher's name	Date of publication
Introduction to Optimization Theory	**Gottfried, B. and Weisman, J.**	**Prentice Hall**	**1973**