ICS1113 OPTIMIZATION

Credits and contact hours: 10 UC credits / 10 hours (2:40 hours lectures; 1:20 hours recitation and 6 hours individual work hours per week)

Instructor’s name: Alvarez Pamela, Larraín Homero, Vera Jorge, Cataldo Alejandro, Carrillo Pamela, Lüer Armin, Giesen Ricardo

Course coordinator’s name Vera Jorge


Course Catalog Description: This course is an introduction to the major topics in Optimization. The student will be introduced to the analysis of engineering problems which can be solved using optimization techniques, and to model formulation, presenting in this way the first elements of the Operations Research discipline. The student will be exposed to the basic theory regarding characterization of solutions to deterministic problems as well as to the main solution techniques, including algorithms for linear and nonlinear problems. Students w develop a project during the semester to apply modeling skills and solution techniques.

Prerequisite Courses: MAT1620 Calculus II and MAT1203 Linear Algebra

Co-requisite Courses: None

Status in the Curriculum: Required

Course Learning Outcomes: 1) Formulate optimization models in various decisions making situations, being able to identify decisions, constraints and objectives. 2) Understand the mathematical properties of Optimization Problems and apply them to identify solutions and its properties. 3) To understand and apply the SIMPLEX method for Linear Programming and other algorithms for nonlinear, integer and network problems. 4) Be familiar with the available software tools to solve optimization problems.
Relation of Course to ABET Criteria:

b. Design and conduct experiments: analyze and interpret data
d. Multidisciplinary teams
e. Identify, formulate, and solve engineering problems
f. Professional and ethical responsibility

Topics covered:

PART I: Motivation and preliminaries: introduction to Operations Research, model construction, basic concepts of minima and equivalent constructions.

PART II: Linear Programming: standard form and the geometry of LP, the SIMPLEX method, sensitivity analysis and duality theory.

