Course: Mathematics
Status: Obligatory
Hours: 30 Hours
Credits: 2

OVERVIEW:

Mathematics intends to provide the student with some basic results of mathematics necessary for further advanced study. Topics covered in the course include basics of linear algebra, multivariable calculus and static optimization.
Prerequisite: Basic Calculus

PROGRAM CONTENT:

I. LINEAR ALGEBRA
I.1 Linear systems

I.2 Eigenvalues and eigenvectors

I.3 Diagonalization

I.4 Quadratic forms with linear constraints

I.5 Partitioned matrices

II. MULTIVARIABLE CALCULUS
II.1 Gradient and directional derivatives

II.2 Convex sets

II.3 (Quasi)concave and (quasi)convex functions

II.4 Taylor's theorem

II.5 Implict and inversion function theorems

II.6 Differentiability

II.7 Existence and uniqueness of solutions of systems of equations

III. STATIC OPTIMIZATION

III.1 Extreme points

III.2 Equality and inequality constraints

III.3 Necessary and sufficient conditions for optimality

IV. TOPICS IN INTEGRATION
IV.1. Multiple integration

IV.2. The Leibniz's formula

IV.3. Change of variables formula

Sheldon Axler, Linear Algebra Done Right, Springer, 2015.

James R. Munkres, Analysis on Manifolds, Addison-Wesley, 1991.

Walter Rudin, Principle of Mathematical Analysis, McGraw-Hill, 1976.

Knut Sydsaeter, Peter Hammond and Arne Strom, Essential Mathematics for Economic Analysis, Pearson, 2012.

Knut Sydsaeter, Peter Hammond, Atle Seierstad and Arne Strom, Further Mathematics for Economic Analysis, Pearson, 2008.

Grading:

First midterm exam covering topics I and II (30%);
Second midterm exam covering topics related to III and IV (30%);
Homework assignments (40%)