Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
SOC162	Mathematics II	2	2	0	0	2	4

Prerequisites	SOC161
Admission Requirements	SOC161

Language of Instruction	French
Course Type	Compulsory
Course Level	Bachelor Degree
Objective	The course comprises two basic parts; linear algebra and differential calculus with multi variables functions. The objective of the first part is to recall to the student elementary linear algebra necessary for the comrehension of the second part as well as to follow other similar courses. The objective of the second part is to transmit to the student fundamental on differential calculus, topology of real functions of several real variables and their optimization.
Content	Week 1 : 1) Factorial, permutation, combinaison (Reminder) 2) Concept of determinant, properties and computation of a determinant. Week 2 : 1) Definition of a matrix, properties, basic operations. 2) Basic matrix operations. Week 3 : 1) Linear equations, solving methods and interpretations of the solutions. 2) Linear and homogen equations, solving methods and interpretations of the solutions. Week 4 : 1) Eigenvalues and eigenvectors of a square matrix. 2) Diagonalization of a square matrix and quadratic forms Week 5 : 1) Quadratic forms. 2) Several real variables functions – Introduction, domain, limits and continuity. Week 6 : 1) Partial derivatives of a functions of several real varibles. 2) Partial derivatives and differantial of a functions of multiple real varibles. Week 7 : 1) Exam 1. 2) Partial derivatives of parametric and implicite functions. Week 8 : 1) Homogenous functions and Euler formula. 2) Directional derlvative, gradient and contour lines. Week 9 : 1) Contour lines. 2) Second order partial derivative, Schwarz theorem Week 10 : 1) Second order partial derivative of parametric and implicite functions. 2) n.th order partial derivative Taylor and Mc-Laurin formulas. Week 11 : 1) Free extrema of two variables functions. 2) Free extrema of two variables functions. Week 12 : 1) Exam 2. 2) Extrema sub consraints of two variables functions. Week 13 : 1) Extrema sub consraints of two variables functions. 2) Free extrema of multivariate functions. Week 14 : 1) Free extrema of multivariate functions. 2) Extrema sub consraints of multivariate functions.

References	Archinard, Gabriel ve Guerrien, Bernard. Principes Mathématiques pour Economistes. Paris : Economica, 1992 Flory, G. Exercices de Topologie et d'Analyse : Topologie. Paris : Vuibert, 1990 Hirsch, Gérard ve Eguether, Gérard. Fonctions de Plusieurs Variables : 364 exercices corrigés. Paris : Masson, 1994 Oudot, Xavier ve Delye-Chevalier, Marie. Analyse: 1re année MPSI. Paris : Hachette Supérieur, 1998 Pichon, Jacques. Topologie dans R Fonctions de Plusieurs Variables. Paris : Ellipses, 1991 Rudin, Walter. Trad. de l'américain par Jean Dhombres. Analyse réelle et complexe : cours et exercices. 3. édition. Paris : Dunod, 1998 Saada, Maurice. Mathématiques Financiéres. Paris : Presses Universitaires de France, 1991. Oudot, Xavier ve Delye-Chevalier, Marie. Analyse: 1re année MPSI. Paris : Hachette Supérieur, 1998

Theory Topics

Week	Weekly Contents
1	Factorial, permutation, combinaison. Concept of determinant, properties and computation of a determinant.
2	Definition of a matrix, properties, basic operations with matrix.
3	Linear equations, solving methods and interpretations of the solutions.
4	Eigenvalues and eigenvectors of a square matrix. Diagonalization of a square matrix and quadratic forms.
5	Several real variables functions – Introduction, domain, limits and continuity.
6	Partial derivatives and differantial of a functions of multiple real variables.
7	Exam 1. Partial derivatives of parametric and implicite functions.
8	Homogenous functions and Euler formula. Directional derlvative, gradient and contour lines.
9	Second order partial derivative, Schwarz theorem.
10	n.th order partial derivative Taylor and Mc-Laurin formulas.
11	Free extrema of two variables functions.
12	Exam 2. Extrema sub consraints of two variables functions.
13	Extrema sub consraints of two variables functions. Free extrema of multivariate functions.
14	Free extrema of multivariate functions. Extrema sub consraints of multivariate functions.