Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
ING218	Numerical Analysis	3	2	1	0	2.5	4

Prerequisites	
Admission Requirements	

Language of Instruction	French
Course Type	Compulsory
Course Level	Bachelor Degree
Objective	This course, which is offered as an elective course to Industrial Engineering students, introduces students to solution techniques for numerical problems.Students will gain basic knowledge and skills for numerical solution of the problems they will encounter both in business life and during their academic careers. In this context, we can list the objectives of this course as follows: Giving ideas about numerical analysis problems, To provide general information about the scope and difficulties of numerical analysis problems, To provide basic knowledge about solution techniques of numerical analysis problems, To provide students with the ability to apply complex numerical analysis, solving techniques and typesetting operations.
Content	Introduction to Numerical Analysis Computer arithmetic and errors in numerical solutions Introduction to Matlab programming Solving nonlinear equations Bisection method and Newton’s method Solving a system of linear equations LU decomposition Iterative methodes Jacobi and Gauss-Seidel Curve fitting Interpolating polynomials Least-square method Numerical differentiation, Taylor Series Expansions Numerical Integration, Trapezoidal method , Simpson’s method
References	Gilat, A., Subramaniam,V., “Numerical Methods for Engineers and Scientists: An Introduction with Applications Using MATLAB”, 3rd ed 2013 Wiley, Hoboken, NJ, USA. Quarteroni, A., Sacco, R. Saleri, F., Methodes Numeriques: Algorithmes, analyse et applications, Springer, 2007, Milano, Italy. Merrien, J-L., Analyse Numerique: Avec MATLAB, Dunod, 2007, Paris, France.

Theory Topics

Week	Weekly Contents
1	Introduction to Numerical Analysis
2	Computer arithmetic and errors in numerical solutions
3	Introduction to Matlab programming
4	Solving nonlinear equations
5	Bisection method and Newton’s method
6	Solving a system of linear equations
7	Midterm
8	LU decomposition
9	Iterative methodes Jacobi and Gauss-Seidel

Week	Weekly Contents
10	Curve fitting
11	Interpolating polynomials
12	Least-square method
13	Numerical differentiation, Taylor Series Expansions
14	Numerical Integration, Trapezoidal method , Simpson’s method