**Content**

| Course Code | Course Name | Semester | Theory | Practice | Lab | Credit | ECTS |
|---|---|---|---|---|---|---|---|
| INF325 | Numerical Analysis | 6 | 3 | 0 | 0 | 3 | 4 |

| | |
|---|---|
| Prerequisites | ING207 |
| Admission Requirements | ING207 |

| | |
|---|---|
| Language of Instruction | Turkish |
| 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:<br><br>Giving ideas about numerical analysis problems,<br>To provide general information about the scope and difficulties of numerical analysis problems,<br>To provide basic knowledge about solution techniques of numerical analysis problems,<br>To provide students with the ability to apply complex numerical analysis, solving techniques and typesetting operations. |
| Content | Introduction to Numerical Analysis<br>Computer arithmetic and errors in numerical solutions<br>Introduction to Matlab programming<br>Solving nonlinear equations<br>Bisection method and Newton’s method<br>Solving a system of linear equations<br>LU decomposition<br>Iterative methodes Jacobi and Gauss-Seidel<br>Curve fitting<br>Interpolating polynomials<br>Least-square method<br>Numerical differentiation, Taylor Series Expansions<br>Numerical Integration,<br>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.<br><br>Quarteroni, A., Sacco, R. Saleri, F., Methodes Numeriques: Algorithmes, analyse et applications, Springer, 2007, Milano, Italy.<br><br>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 |