

# Syllabus

## Course Meeting Times

Every Friday: 14:00-17:00

## Course Description

The course involves the study of basic data structures (e.g., stack, queue, linked list, tree, binary search tree) and associated algorithms.

## Exams and Grading

Two homework (7.5% each), three quizzes (5% each), one midterm exam (%30), and one final exam (40%).

Before the final exam, the sum of your grades during the semester (except the final exam and quizzes) must **be larger than 50: Midterm + Homework 1 + Homework 2 >= 50**

**Midterm Exam:** 8<sup>th</sup> of December, 2023

## Textbooks

- Python\_Programming\_and\_Numerical\_Methods\_A\_Guide\_for\_Engineers\_and\_Scientists.

## Course web address

<http://www.ninova.itu.edu.tr>

LEC #	TOPICS
1	Core Python: Python interpreter, data structures, operators, conditionals and loops
2	Python Functions and Modules: variable scope, functions, modules, file I/O
3	Python Mathematics Modules: math functions, numpy, scipy, matplotlib
4	Systems of Linear Equations: Solvability condition, Gaussian Elimination
5	Iteration Methods- Jacobi Method, Gauss-Seidel
6	Interpolation and Approximation: Newtons divided differences, Lagrange's Method,
7	Interpolation and Regression: Interpolation using spline functions, Least squares fit
8	Rootfinding: Bisection Method, Newton-Raphson Method
9	Rootfinding: Secant Method, Fixed Point Iteration Stability
10	Numerical Differentiation: Finite difference approximations, Richardson Extrapolation
11	Numerical Integration: The trapezoidal and Simpson Rules
12	Numerical Integration: Romberg Numerical Integration
13	Initial Value Problems: Euler's Method
14	Initial Value Problems: Runge-Kutta Methods