

# FIVE WEEKS SHORT COURSE ON MATLAB/ SIMULINK

WITH SPECIAL EMPHASIS ON PC-MICROCONTROLLER INTERFACING, CONTROL ENGINEERING AND IMAGE PROCESSING

COURSE CODE: MAT-401

## Introduction

MATLAB is one of the most popular numerical computing environment and programming language used for research and development mostly in engineering and sciences both in the academia and industry world wide. This course is designed for students and practicing engineers who desire to use MATLAB to supplement their studies, project-work or research. The course will also enable engineering students (first/second/third/fourth year) to use this powerful tool in their studies and develop/enhance their programming skills. It shall also be helpful for individuals aspiring to undertake MS/PhD studies or are currently enrolled in such a programme. The course will cover both theory and hand-on practice. Course material such as presentation slides/handouts shall be provided.

## Course Contents

- Basic introduction, overview of MATLAB/SIMULINK product family and toolboxes.
- MATLAB desktop, variables, arrays, structures, strings, relational and logical operations.
- Control flow, matrix computations, plotting, writing M-files and M-functions.
- Hardware interfacing using serial/parallel communication.
  - Serial port overview, pin assignments, data format, serial port object.
  - Communication configuration, MATLAB-AVR microcontroller serial interfacing.
  - Parallel port overview, pin assignment, communication parameters setting.
  - Communication between PC (running MATLAB) and the 89C51 microcontroller.
- Introduction to control toolbox, basic analysis commands for an LTI system.
- Simulation of first and second order LTI system using numerical integration.
- Introduction to image processing toolbox, image formats, read/write and formatting images.
- Image operations in spatial/transform domains, image partitioning and block processing.
- Development of Graphical User Interface (GUI).
- SIMULINK basics, creating a model, working with block sets.
- Use of SIMULINK in hardware interfacing/control engineering/image processing.

## Training Facilities

Multimedia classroom, P-IV machines, hardware lab, aircon and back-up generator.

## Timings and Duration

3pm-5pm, 20 HOURS (4 HOURS/WEEK): For a group of participants, timings can also be adjusted. Weekends (6 Hrs/Day)

## Course Fee

Rs. 5000/-

## Registration and Venue

Rastek Technologies, C-15, Classic Center, Block-16, near PIA office, Gulshan-e-Iqbal, Main University Road, Karachi.

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