# PHoEnix Association presents

# MATLAB WORKSHOP

## SUMMARY

1. **UNIT OF STUDY**: MATLAB
2. **OBJECTIVE**: Teach the basic concepts of MATLAB to prepare students for 2nd year courses.
3. **INSTRUCTOR**: Avinash Bhat and Raghuram C S
4. **TIME**: 5-6 hrs divided into 3 interactive live sessions.

## WHAT IS MATLAB?

MATLAB is a programming platform designed specifically for engineers and scientists to analyze and design systems and products that transform our world. The heart of MATLAB is the MATLAB language, a matrix-based language allowing the most natural expression of computational mathematics.

## WHAT CAN YOU DO WITH MATLAB?

It is a language used for:

- Analyzing Data
- Developing Algorithms
- Creating Models and Applications

MATLAB lets you take your ideas from research to production by deploying to enterprise applications and embedded devices, as well as integrating with Simulink and Model-Based Design.

## SCOPE OF THE COURSE

The course is designed to cover the basics of MATLAB and Simulink coupled with a project which will give a hands-on experience for the course taker to design and simulate

signal and image processing systems and control systems by capturing algorithms an system models. The course will aim to make the student proficient at using multiple facilities of MATLAB and Simulink like Built-in functions , algorithms ,etc. for analyzing signals. **Taught in SIGNALS AND SYSTEMS : CDC for PHoEnix**

## COURSE PLAN

| Class No. | Topics to be covered | Learning Objectives |
|---|---|---|
| 1 | Introduction to MATLAB and SimuLink | • Introduction to MATLAB and general terms.<br>• Fundamentals of SimuLink.<br>• Various functions in MATLAB.<br>• Plotting graphs in MATLAB.<br>• Matrix and Math.<br>• Step/Ramp Signals.<br>• Linear Control System examples. |
| 2 | Mathematical modelling of functions and signal visualisation. | • Convolution.<br>• Fourier Transform.<br>• Discrete Fourier Transform.<br>• Fast Fourier Transform.<br>• Laplace Transform. |
| 3 | Controllers and their applications. | • PID Controller<br>• Controller for battery charging.<br>• Safety Feedback Loop. |

## SOFTWARE REQUIREMENTS

MATLAB and Simulink (Mathworks products) have free students' licenses for a few universities. If you are unable to download large files, you may use the online version of MATLAB, and Xcos instead of Simulink.

## MATERIAL AND RESOURCES

Resources corresponding to the topics covered in each class would be provided as the course goes on for better understanding and further reading.

## ASSESSMENT

A Certificate of Participation will be awarded to participants who attend the sessions and complete the beginner tasks assigned. At the end of the course, a project assignment will be released in the last session , which will be the metric for leaderboard consideration. A Certificate of Merit will be awarded based on the final project submitted by the course taker.