

Short term Course  
on  
**MATLAB, SIMULINK AND LABVIEW FOR ENGINEERING APPLICATIONS**  
19<sup>th</sup> - 23<sup>rd</sup> February, 2007  
Organized by  
**DEPARTMENT OF ELECTRICAL ENGINEERING**  
**NATIONAL INSTITUTE OF TECHNOLOGY**  
**ROURKELA – 769008, ORISSA**

**About the course**

MATLAB<sup>®</sup> is a high-performance language for technical computing. It integrates computation, visualization, and programming in an easy-to-use environment where problems and solutions are expressed in familiar mathematical notation. MATLAB<sup>®</sup> features a family of application-specific solutions called *toolboxes*. Areas in which toolboxes are available include signal processing, control systems, neural networks, fuzzy logic, simulation, and many others. Some of the application areas of the MATLAB and SIMULINK include electromechanical systems and products, control system design/analysis, modeling, simulation and optimization, chemical and industrial process control, signal processing and filtering, test equipment/instrumentation, digital servo systems, Motor and motion control, system identification/parameter estimation and speech Processing.

The course will provide a hands-on learning experience in the basic operation and utilization of MATLAB and Simulink to solve many technical computing problems in a fraction of the time it would take to write a program in scalar non-interactive language such as C or FORTRAN.

Apart from MATLAB and SIMULINK, the course will also give a solid foundation for developing sophisticated applications for data acquisition & instrumentation for process control using LABVIEW. The course will emphasize on how Virtual Instrumentation technology can be useful in the Automation in Iron and Steel Industry, Metallurgical Processes, Process Automation, Mining as well as maintenance and monitoring of engines and machines.

**COURSE CONTENTS**

1. An Introduction to MATLAB

- MATLAB Fundamentals
- MATLAB Environment and Command Window
- Saving and re-loading a work
- MATLAB demos
- Vector and Matrix Manipulation
- Scalar Operations
- Matrix Operations

2. Programming in MATLAB

- Basics of MATLAB programming structure
- Script Files
- Functions
- Debugging Programs
- Creating functions using m-files
- Loops, branches and Control flow
- Relational and logical operations
- Advanced data objects: Multidimensional matrices and structures

3. MATLAB Graphics

- Two and Three-dimensional graphics
- Multiple Plots
- Axis Scaling
- Printing Graphics
- Animation

#### 4. Numerical Analysis

- Nonlinear equations and optimization
- Differential equations

#### 5. Introduction to SIMULINK

- What can SIMULINK be used for?
- Creating Models, Blocks
- Systems and Subsystems
- Simulating Dynamic Systems
- Solving a Model, Solvers
- MATLAB Simulink Integration
- S Function
- SIMULINK and GUIs
- SIMULINK Exercises

#### 6. MATLAB Toolboxes training

Signal Processing Toolbox, Neural Network, Fuzzy Logic, Control System, Communication Toolbox, Power System etc.

#### 7. LabVIEW :

Introduction to LabVIEW, Sources of information, Virtual Instrumentation, Wiring & Programming Basics, Controls, Indicators, & Constants, Enumerated constants & rings, Debugging, Preferences, Charting, Graphs, Attribute nodes, Do & While Loops, Shift Registers, For Loops, Arrays, Clusters, Efficiency Issues, Priority Handling, Case Structures, Global & Local Variables, Sequence Structures, Formula Nodes, Creating a Sub-VI, String, File I/O, Customizing VI's, Customizing Controls, Introduction to Data Acquisition.

#### **FACULTY**

The course will be offered by faculty members of the NIT, Rourkela and experts from National Instruments, India.

#### **REGISTRATION AND FEE PARTICULARS**

Applications in prescribed format and the course

fee in the form of a cheque/demand draft drawn in favour of **"Continuing Education, NIT Rourkela"** payable at SBI, NIT Branch, Rourkela-8 (code- 2109) coordinator on or before **31<sup>st</sup> January 2007**.

Educational Institutions: Rs. 3000

Industry and R&D organizations : Rs. 6000

Registration fee includes boarding, lodging and course materials. Travel expenses shall be borne by the participants.

#### **ACCOMODATION**

Suitable accommodation will be provided in the Visitor's house on prior request.

Certificate will be given to the participants after successful completion of the course under the Continuing Education Programme of the Institute.

#### **CORRESPONDENCE**

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