MATLAB® Fundamentals and Programming Techniques (20 hours)

This course mainly deals with MATLAB® programming techniques. MATLAB® is a programming environment for algorithm development, data analysis, visualization, and numerical computation. Using MATLAB®, you can solve technical computing problems faster than with traditional programming languages, such as C, C++, and FORTRAN.

COURSE CONTENT :	
MATLAB® Product Description (30 min)	• Key features • Architecture
MATLAB® Software (1 hour)	• Introduction to MATLAB® Software • MATLAB® windows • Command Window • Editor Window • Workspace • Command History • Current directory

MATLAB® Data Types (1 hour)	• Data types
	    o Numeric
	    o String
	• Data type conversion
	    o Numeric to String
	    o String to Numeric

Operators & Special characters (1 hour)	• Arithmetic operators • Bit-Wise Operators • Relational Operators • Logical Operators
Complex Numbers & Trigonometric functions (1 hour)	To work with complex numbers and trigonometric functions in MATLAB®

Matrices and Arrays **(3 hours)**	- Array Initializations - About Matrices - Generating Matrices - Matrix Sum, transpose, diagonal, inverse - Matrix Multiplication, division - The magic Function - Matrix and Array Operations - Matrices and Magic Squares
Types of Arrays **(2 hour)**	- Multidimensional Arrays - Structures - Cell Arrays
Loops and Conditional Statements **(3 hours)**	- Control Flow - Conditional Control — if, else, switch - Loop Control — for, while, continue, break - Program Termination — return
Functions **(3 hours)**	- Writing user defined functions - Function calling - Return Value - Types of Functions - Global Variables
Plots **(2 hours)**	- Plotting vector and matrix data - Plot labelling, curve labelling, legend and colour bar editing - Plot types *2-D Plots* - Basic Plotting Functions - Creating a Plot - Plotting Multiple Data Sets in One Graph - Specifying Line Styles and Colors - Graphing Imaginary and Complex Data - Figure Windows - Displaying Multiple Plots in One Figure - Controlling the Axes *3-D Plots* - Creating Mesh and Surface - About Mesh and Surface Visualizing - Subplots

M-files **(2 hours)**	• The MATLAB® Editor • Script M-files • The MATLAB® path • Function M-files • Sub-functions and nested functions • Debugging • Best script file writing tactics
Visualizing the different applications in MATLAB® **(30 min)**	• Statistical parameter estimations • DSP applications • Image Processing applications • Control System applications