Maulana Abul Kalam Azad University of Technology, West Bengal
(Formerly West Bengal University of Technology)
Syllabus for B. Tech in Computer Science & Engineering
(Applicable from the academic session 2018-2019)

Subject Code : PCC-CS 393	**Category:** Professional Core course
Subject Name : IT Workshop (Sci Lab/MATLAB/Python/R)	**Semester** : Third
L-T-P : 1-0-4	**Credit:3**
Pre-Requisites: No-prerequisite	

Programming in R

1.Introduction to mechanism for statistics, data analysis, and machine learning; Introduction of R Programming, How to install and run R, Use of R help files, R Sessions, R Objects – Vectors, Attributes, Matrices, Array, Class, List, Data Frames etc.Operators in R.

2. R Programming Structures, Control Statements, Loops, Repeat and Break, R-Function, R-Vector Function, Recursive Function in R.

3.R Packages (Install and Use), Input/Output Features in R, Reading or Writing in File. Data Manipulation in R.Rearranging data , Random Number and Simulation, Statistical methods like min, max, median, mean, length, Linear Regression, Normal Distribution, Decision tree

4.Graphics, Creating Graphs, The Workhorse of R Base Graphics, Graphical Functions – Customizing Graphs, Saving Graphs to Files, Pie chart, Bar Chart, Histogram.

Programming in Matlab

1. Introduction
1.1 Why MATLAB? 1.2 History 1.3 Its strengths 1.4 Competitors 1.5 Starting MATLAB, 1.6 Using MATLAB as a calculator, 1.7 Quitting MATLAB

2. Basics
2.1 Familiar with MATLAB windows 2.2 Basic Operations 2.3 MATLAB-Data types 2.4 Rules about variable names 2.5 Predefined variables

3. Programming-I
3.1 Vector 3.2 Matrix 3.3 Array Addressing 3.4 Built-in functions 3.5 Mathematical Operations 3.6 Dealing with strings (Array of characters) 3.7 Array of array (cell) concept

4. Programming-II
4.1 Script file 4.2 Input commands 4.3 Output commands 4.4 Structure of function file 4.5 Inline functions 4.6 Feval command 4.7 Comparison between script file and function file

5. Conditional statements and Loop

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5.1 Relational and Logical Operators – 5.2 If-else statements 5.3 Switch-case statements 5.4 For loop 5.5 While loop 5.6 Special commands (Break and continue) 5.7 Import data from large database 5.8 Export data to own file or database

6. 2D Plotting
6.1 In-built functions for plotting 6.2 Multiple plotting with special graphics 6.3 Curve fitting 6.4 Interpolation 6.5 Basic fitting interface

7. 3D Plotting
7.1 Use of meshgrid function 7.2 Mesh plot 7.3 Surface plot 7.4 Plots with special graphics

Programming with Python

Introduction
History,Features,Setting up path,Working with Python,Basic Syntax,Variable and Data Types, Operator

Conditional Statements
If ,If- else,Nested if-else,Looping,For,While,Nested loops

Control Statements
Break, Continue, Pass

String Manipulation
Accessing Strings, Basic Operations, String slices, Function and Methods

Lists
Introduction, Accessing list, Operations, Working with lists, Function and Methods

Tuple
Introduction,Accessing tuples,Operations,Working,Functions and Methods

Dictionaries
Introduction, Accessing values in dictionaries, Working with dictionaries,Properties

Functions
Defining a function,Calling a function,Types of functions,Function Arguments,Anonymous functions,Global and local variables

Modules
Importing module, Math module, Random module, Packages,Composition, Input-Output

Printing on screen, Reading data from keyboard, Opening and closing file, Reading and writing files, Functions

Exception Handling
Exception, Exception Handling,Except clause, Try ? finally clause, User Defined Exceptions