**MATLAB Beginner Level Course**

**Instructor: Engr. M Mudassir Shakeel**

**“Note:** Classes will be on every Saturday at 2:30 pm”

**Syllabus**

The course is divided into the following 4 weekly modules:

**Lesson 1A: Introduction to MATLAB**

We will learn how to start MATLAB and will familiarize ourselves with its user interface. We will learn how to use MATLAB as a sophisticated calculator. We will learn about syntax and semantics. We will see ways in which MATLAB provides help. Finally, we will learn how to create plots in MATLAB.

**Lesson 1B: Matrices and Operators**

The basic unit with which we work in MATLAB is the matrix. We solve problems by manipulating matrices, and operators are the primary means by which we manipulate them. We will learn how to define matrices, extract parts of them and combine them to form new matrices. We will learn how to use operators to add, subtract, multiply, and divide matrices, and we will learn that there are several different types of multiplication and division. Finally, we will learn MATLAB’s rules for determining the order in which operators are carried out when more than one of them appear in the same expression.

**Lesson 2A: Functions**

Functions let us break up complex problems into smaller, more manageable parts. We will learn how functions let us create reusable software components that can be applied in many different programs. We will learn how the environment inside a function is separated from the outside via a well-defined interface through which it communicates with that outside world. We will learn how to define a function to allow input to it when it initiates its execution and output from it when it is done.

**Lesson 2B: Programmer’s Toolbox**

MATLAB has useful built-in functions and we will explore many of them in this section. We will learn about polymorphism and how MATLAB exploits it to change a function's behavior on the basis of the number and type of its inputs. Because random numbers play an important role in computer programming, we will learn how to use the MATLAB random number generator. We will learn how to get input from the keyboard, how to print to the Command Window, and how to plot graphs in a Figure window. Finally, we will learn how to find programming errors with the help of the debugger.

**Lesson 3A: Selection**

Selection is the means by which MATLAB makes decisions about the order in which it executes its statements. We will learn how to use the if-statement, which is the most important method of selection. We will learn how to use relational operators and logical operators. We will learn how to write polymorphic functions and how to make functions resistant to error.

**Lesson 3B: Loops**

Loops give computers their power. We will learn how to use both of MATLAB's loop constructs: the for-loop and the while-loop. We will learn how the break-statement works, and we will use nested loops. We will learn how to make loops more efficient. We will learn about logical indexing and will see how to use it to produce implicit loops that are efficient and easy for a user to understand.

**Lesson 4A: Data Types**

Computers operate on bits, but humans think in terms of numbers, words, and other types of data. Like any good language, MATLAB organizes bits into convenient data types. We will study those types in this section. We will learn that there are ten types of numbers and that there are conversion functions to change one type into another. We will learn much more about character arrays and how the characters in them are encoded as numbers. We will learn how to produce heterogeneous collections of data via structs and cells.

**Lesson 4B: File Input/Output**

Files are named areas in permanent memory for storing data that can be used as input or output to MATLAB and to other programs. We will be introduced to MATLAB’s most important methods for reading and writing files. We will learn how to create, read from, and write into MAT-files, Excel files, text files, and binary files. We will learn how to navigate among folders with MATLAB commands.

**Assignment and Projects:**

It will be disclose during Course