Course Type	Course Code	Name of Course	L	T	P	Credit
DC	NGLC523	Programming in MATLAB	3	0	0	3

Course Objective
The primary objective of the course is to introduce programming, data analysis and plotting in MATLAB and its applications in earth sciences.
Learning Outcomes
Upon completion of the course, the student will be able to: • Write and read MATLAB Programs. • Work with other MATLAB programs and its application especially in the field of geosciences.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1.	Introduction: Why MATLAB, History, its strengths and weaknesses, competitors, starting MATLAB, using MATLAB as a calculator, quitting MATLAB	3	This unit will help the student in understanding what is MATLAB programming language and its strength and weakness.
2.	Basics: Familiar with MATLAB windows, Basic Operations, MATLAB-Data types, Rules about variable names, Predefined variables,	5	This unit will help the student in learning the basic operations in MATLAB; rules and type of variables.
3.	Programming-I. Vector, Matrix, Array Addressing, Built-in functions, Mathematical, Operations, Dealing with strings (Array of characters). Array of array (cell) concept.	7	This unit will help the student in understanding vector, array & matrix function in MATLAB.
4.	Programming-II: Script file, Input commands, Output commands, Structure of function file, Inline functions, Comparison between script file and, Function file.	6	This unit will help the student in understanding how to input commands in MATLAB and what is its output, structure of function file.
5.	Conditional statements and Loop: Relational and Logical Operators, If-else statements. Switch-case statements, For loop, while loop, Special commands (Break and continue).	5	This unit will help the student in understanding relational and logical operators; If-else commands.
6.	Creating a database, import data from large database, modifying table content, Export data to own file or database, 2D Plotting: In-built functions for plotting. Multiple plotting with special graphics, Curve fitting. Interpolation, Basic fitting interface, 3D Plotting: Use of mesh-grid function. Mesh plot, Surface plot, Plots with special graphics.	6	This unit will help the student to explore various type of plotting options using MATLAB.
7.	GUI: Creating menu window for providing input, Creating graphical user interface.	4	This unit will help the student to gain basic knowledge on Graphical User Interface (GUI).
8.	Applications in Geoscience	6	This unit will help the student to understand and apply MATLAB programming in solving geosciences problems.
Total Classes		**42**	

Text Books:

1. Mikhailov, E. E. (2018). *Programming with MATLAB for Scientists: A Beginner's Introduction*. CRC Press.

Reference Books:

1. Trauth, M., Gebbers, R., Sillmann, E., & Marwan, N. (2007). *MATLAB®Recipes for Earth Sciences*. Springer Berlin Heidelberg.
2. Attaway, S. (2013). *Matlab: A Practical Introduction to Programming and Problem Solving*. Elsevier Science.