

## Details of Course

Course Title	Course Structure			Pre-Requisite
	L	T	P	
Introduction to Computing -B.Tech. EP III Sem Lesson Plan	3	0	2	

### Course Objectives

This course is designed for the third semester (second year) students of the B. Tech. (Engineering Physics). This course offers to familiarize the students with the widely used software Matlab so that they can develop the skill to solve the problem related to applied physics and engineering using Matlab

### Course Outcomes (CO)

The students should be able:

1. to develop the ability of the handling the matrix and array operation in order to solve multifaceted problems
2. to design solutions for the complex problem related to engineering sciences using various types of inbuilt functions and user defined functions
3. to efficiently perform data analysis which is exceedingly applicable in various branches of science and engineering
4. to develop the problem analysing skills and to design the algorithms for the solution of complex problems of applied physics and engineering
5. to use the gained knowledge of this course to design the minor-research project related activities

S. No.	Content	Contact Hours
Unit 1	Introduction to Matlab: Advantages and disadvantages, Matlab environment: Command window, Figure window, Edit window, Variables and Arrays: Initializing variables in Matlab, Multidimensional arrays, Subarrays	04
Unit 2	Special values, Displaying output data, Data file, Scalar and array operations, Hierarchy of operations, Built-in-Matlab functions, Introduction to plotting: 2D and 3D plotting. Branching Statement and Program design: Introduction to top-Down design Technique, Use of pseudo code, Relational and logical operators, Branches, additional plotting features of Matlab	08
Unit 3	Loops: The while loop, for loop, details of loops operations, break and continue statement, nesting loops, Logical arrays and vectorization, User Defined Functions: Introduction to Matlab functions	08

Unit 4	Variable passing in Matlab, Optional arguments, Sharing data using global memory, preserving data between calls to a function, function functions, Subfunction and private function	08
Unit 5	Complex Data and Character Data: Complex data, String functions, Multidimensional arrays, Additional 2D plots, three dimensional plots, Input/Output Function: Text read function, load and save commands.	08
Unit 6	An introduction to Matlab file processing, file opening and closing, Binary I/O functions, Formatted I/O functions, comparing binary and formatted functions, file positioning and Status functions, Numerical methods and developing the skills of writing the program	06
	Total	42

Books:

S. No.	Name of Books/Authors/Publisher
1.	MATLAB Programming for Engineers by Steven C. Chapra, 2012/ Cengage
2.	Getting Started with MATLAB: A Quick Introduction for Scientists and Engineers, 2010/ Oxford
3.	Mastering MATLAB by Duane C. Hanselman, 2008/Pearson
4.	Computational Photonics: An Introduction with Matlab by M. S. Wartak, 2013/ Cambridge University Press
5.	Matlab: An Introduction with Applications by Amos Gilat, 2007/ Wiley India Private Limited
6.	A Concise Introduction to Matlab by W. J. Palm III, 2012/McGraw Hill

### List of Experiments for Introduction to Computing

1. Basics of Matrix operation and Matrix manipulation
2. Write Matlab program for very famous Blackbody radiation and verify Wein's displacement law.
3. Write Matlab program to calculate the maximum number of modes supported by the planar waveguide and step-index optical fiber.
4. Write Matlab program to calculate the values of inbuilt defined trigonometric functions using series solution approach. Compare the results with inbuilt functions.
5. Write Matlab program to study of the behavior of Gaussian and Lorentian function using all appropriate inbuilt 2d and 3d plotting commands.
6. Write Matlab program to find out the unknown coefficients by Polynomial fitting.
7. Write Matlab program to solve the second order differential equation of the pendulum problem.
8. Write Matlab code to plot the intensity distribution of Single-slit, double slit and N-slit all together. Analyze the result. Show how young's double slit experiment is different from the double slit diffraction.
9. Write Matlab program to find out the roots of a given equation using bisection method. Compare the results using Matlab inbuilt functions.
10. Write Matlab code to show the propagation of group wave as a function of time.