

Course Type	Course Code	Name of the Course	L	T	P	Credits
DP	NCSC504	Computing Techniques and Mathematical Tools Lab	0	0	3	1.5

Course Objective

- Enhancement of mathematical, statistical and programming skills of the students with an objective to enable them to deal with other subjects with higher level of comfort, understanding and confidence.
- A better comprehension and command over the concepts taught in the theoretical classes

Learning Outcomes

The knowledge and concepts acquired in the laboratory classes will help the students do better in future in research and commercial applications.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Introduction, Matlab programming for implementation, plotting and visualization.	6	The students will salient operations and techniques of MATLAB programming
2	Lab. on Statistics: Linear and nonlinear regression, multiple regression, partial regression, kernel regression, logistic regression	6	The students will learn about important statistical techniques
3	Lab. on optimization and searching techniques : Linear programming, optimization(golden section search, simulated annealing)	6	The students will learn about important optimization techniques
4	Lab. on matrix processing: Solution of linear algebraic equations (Gaussian elimination, LU decomposition, SVD, sparse systems) Eigen systems	6	The students will learn about matrix and matrix related operations
5	Lab. on Special functions (beta function, error function, hypergeometric function, Bessel, Legendre),	3	The students will learn about some special functions and their applications
6	Lab. on FFT, other integral transforms, wavelets, Differential equation and partial differential equation based systems(like diffusion etc)	6	The students will ;learn about important integral transforms and differential equation based systems
7	Lab. on Numerical Techniques: Interpolation and approximation, numerical differentiation /integration / differential equation/partial differential equations	6	The students will learn about important numerical techniques
8	Lab. on Python and R, shell programming,	3	The students will learn about programming
Total		42	

Text Books:

1. MATLAB® Programming for Engineers, Stephen J. Chapman, THOMSON publishers
2. Programming Python, Mark Lutz Publisher(s): O'Reilly Media, Inc

Reference Books: None