Programme	**Master of Technology in Mechanical Engineering**				Year of Regulation		**2018**
Department	**Mechanical Engineering**				Semester		**I**

Course Code	Course Name	Credit Structure				Marks Distribution		
		L	T	P	C	Continuous evaluation	Quiz/Viva	Total
ME 555	**Computational Laboratory-I**	**0**	**0**	**2**	**1**	**70**	**30**	**100**

Course Objectives	1. To develop students' ability to program using C/Matlab.	Course Outcomes	CO1	Understand basic concepts of C/Matlab programming and able to write programs using C/Matlab (Understand).
	2. To develop students with some knowledge of solving system of linear equation using various linear solver techniques e.g., Gauss-Siedel, Jacobi, SOR, TDMA and ADI.		CO2	Classify and compare different iterative methods. (Understand and Apply)
			CO3	Understand different schemes in finite difference method and analyse order of accuracy of these schemes. (Understand and Apply)
	3. To develop students' ability to identify types of PDEs and solve the same using Finite Difference schemes using various linear solvers for fluid flow and heat transfer problems.		CO4	Apply Finite Difference techniques using linear solver in 1D and 2D heat conduction and fluid flow problems. (Apply)

	SYLLABUS		
No.	Content	Hours	COs
I	**A Brief Review of Computer Programming** C-Programming, MATLAB commands and tool boxes.	**10**	**CO1**
II	**Solution of PDEs** Gauss - Seidel method, Jacobi's method, Successive Over-Relaxation (SOR) method, ADI method, TDMA for solution of fluid flow and heat transfer problem.	**06**	**CO2**
III	**Solution of ODEs** Finite difference method, forward, backward, central difference of first and second order PDEs, 1-D and 2-D heat conduction and fluid flow problems in Cartesian, cylindrical and spherical coordinate systems.	**12**	**CO3 CO4**
	Total Hours	**28**	

Essential Readings

1. E. Balagurusamy, "Programming in ANSI C", Tata McGraw-Hill Education

2. B. Ram, "Numerical Methods", Pearson

Supplementary Readings

1. R. Pratap, "Getting Started With MATLab: A Quick Introduction for Scientists and Engineers", Oxford University Press

2. Y.Kanetkar, "Let us C", Bpb Publications.