

SRM University
M.Tech Automotive Hybrid Systems Engineering
 (Collaborative program with NFTDC, Hyderabad)
 (Proposed syllabus from the academic year 2015-16)

Supportive courses

		L	T	P	C
MA2007	APPLIED MATHEMATICS FOR MECHANICAL ENGINEERS	3	0	0	3
	Total Contact Hours-45				
	Prerequisites				
	Nil				
PURPOSE					
To develop analytical capability and to impart knowledge in Mathematical and Statistical methods and their applications in Engineering and Technology and to apply these concepts in engineering problems they would come across.					
INSTRUCTIONAL OBJECTIVES					
At the end of the course, Students should be able to understand Mathematical and Statistical concepts and apply the concepts in solving the engineering problems.					

UNIT I TRANSFORM METHODS (9 hours)

Laplace transform methods for one-dimensional wave equation - Displacements in a string - Longitudinal vibrations of an elastic bar – Fourier transform methods for one-dimensional heat conduction problems in infinite and semi-infinite rod.

UNIT II ELLIPTIC EQUATIONS (9 hours)

Laplace equation - Fourier transform methods for Laplace equation – Solution of Poisson equation by Fourier transform method.

UNIT III CALCULUS OF VARIATIONS (9 hours)

Variation and its properties - Euler's equation - Functionals dependent on first and higher order derivatives - Functionals dependent on functions of several independent variables - Some applications - Direct methods - Ritz methods.

UNIT IV NUMERICAL SOLUTION OF PARTIAL DIFFERENTIAL EQUATIONS (9 hours)

Numerical Solution of Partial Differential Equations - Solution of Laplace's and Poisson equation on a rectangular region by Liebmann's method - Diffusion equation by the explicit and Crank Nicholson implicit methods - Solution of wave equation by explicit scheme.

UNIT V REGRESSION METHODS (9 hours)

Principle of least squares - Correlation - Multiple and Partial correlation - Linear and non-linear regression - Multiple linear regression.

References:

1. Sankara Rao K., Introduction to Partial Differential Equations, 4th printing, PHI, New Delhi, April 2003

2. Elsgolts L., Differential Equations and Calculus of Variations, Mir Publishers, Moscow, 1966
3. S.S. Sastry, Introductory Methods of Numerical Analysis, 3rd Edition, PHI, 2001
4. Gupta S.C. and Kapoor V.K., Fundamentals of Mathematical Statistics, Sultan Chand and Sons, New Delhi, Reprint 2003.