LOK JAGRUTI UNIVERSITY (LJU)

L J INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Mechanical Engineering

Master of Engineering (M. E) - Semester – I

		Teaching Scheme				
Course Code:	49050101	Lecture (L)	Tutorial (T)	Practical (P)	Credit	Total Hours
Course Name:	Advanced Engineering Mathematics-1					
Category of Course:	Core	2	2	0	4	40
Prerequisite Course:	UG level course in Engineering Mathematics					

Course Objectives			
1	To derive Metrix representation of system of linear equations, linear transformation and concepts of Inner products.		
2	To understand the importance of basis and orthogonality in Eigen value and Eigen vector.		
3	To develop the skill different types of methods of solving Differential equations.		
4	To able to apply different conditions as per requirement in methods Advanced Engineering Mathematics.		
5	To able to apply accurate Mathematical methods in real life problems of Mechanical Engineering.		

Units Topic Prerequisite Topic Teaching Hours 01 1.1 Introduction of Matrix and Linear Algebra	Syllabus				
Basic of Matrix and Linear Algebra 04 1.1 Introduction of Matrix and Linear algebra. 04 1.2 Matrices & System of linear capations.	Unit No.	Торіс	Prerequisite Topic	Teaching Hours	
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	Method to solving Partial Differential Equations		
10	10.1 Introduction to Partial Differential Equations		04 (10%)
	10.2 Method of Separable Variables to solve PDE.		
	10.3 Introduction of Wave and Heat Equation and their Solutions.		(10/0)
	10.4 Example's solution of Wave & Heat equations by Fourier Series.		

Course	Outcome
1	Students will understand fundamentals of Linear Algebra and their geometrical meanings.
2	Students will be able to solve problems in their relevant branch using mathematical methods of linear algebra.
3	Students will be able to apply knowledge of Laplace & Fourier Transform in different fields of mechanical branch.
4	Students will be able to get best accurate solutions Using Approximation methods.
5	Students will be able to develop Ordinary and partial Differential equations in their relevant fields.
6	Students will be able to solve mechanical system problems using IVP & BVP.
Suggest	ed Reference Books
1	Bronson, R. "Matrix Operations", Schaum's outline series, 2 nd Edition, McGraw Hill, 2011.
2	Advanced Engineering Mathematics by Erwin Kreyszig.
3	O'Neil, P.V., "Advanced Engineering Mathematics ", Thomson Asia Pvt. Ltd., Singapore, 2003.
4	Introduction to Linear Algebra, Strang Gilbert 5th ed. Wellesley, MA: Wellesley-Cambridge Press
5	Differential Equations: Theory, Technique and Practice, G.F. Simmons, S. G. Krantz, Tata Mc GrawHill Publishing, 2007.
6	An introduction to Ordinary Differential Equations, James C. Robinson, Cambridge University Press, New York, 2008 (4th print).
7	Differential Equations and their Applications by M Braun
8	An Introduction to Ordinary Differential Equations by Earl A Coddington and Mathematics
9	Partial Differential Equations by Erich Miersemann Department of Mathematics Leipzig University.

Proposed Evaluation Scheme by Academicians (Percentage of Weightage out of 100%)					
Theory Descriptive Test	MCQ Test	Hands on Project			
Formulas and Derivation Test	Numerical Test	Seminar			

Practical Project/Hands On Project				
Sr. No.	List of Practical Projects	Linked with Unit		
1	Identify Matrix Transformation for Image editing features like zooming, scaling, rotating, etc	Unit 1		
2	Define Different Vector space with different Operations.	Unit 2		
3	Describe geometric approach of Quadratic form in to Canonical form with example.	Unit 3		
4	Derive general form of Projections.	Unit 4		
5	Define problems in Least squares method.	Unit 5		
6	Find and apply concepts of Laplace Transform in Mechanical branch.	Unit 6		
7	Find and apply concepts of Fourier Transform in Mechanical branch	Unit 7		
8	Construct one real life 1 st order Ordinary Differential Equation	Unit 8		
9	Construct one Higher order Ordinary Differential Equation and solve with IVP.	Unit 9		
10	Describe Heat equation Solution with different boundary value Problems.	Unit 10		