

19BSM506 – Advanced Ordinary Differential Equations										
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	1	--	4	4	25	50	25	--	--	100
<b>OBJECTIVES</b>										
<p>1. Working with system of ordinary differential equations and non-linear ordinary differential equations is stressed.</p> <p>2. Being able to formulate and find solutions to more complex mathematical problems encountered in the applied sciences.</p> <p>3. Able to understand the existence and uniqueness of the solutions of ordinary differential equations.</p>										
<b>SYLLABUS</b>										
<b>Unit-I</b>										<b>10</b>
Basic Concepts and Linear Equations of the First Order: Classification, Initial and Boundary Value problems, First Order Linear equation, Exact Equations; Linear Differential Equations of Higher Order: Higher Order Equations, Linear Independence, Equation with constant coefficients, Equation with Variable Coefficients, Wronskian, Method of Variation of Parameters, Reduction of the order of equation.										
<b>UNIT II</b>										<b>10</b>
Existence and Uniqueness of solutions: Successive Approximations, Picard's theorem and its Proof, Some Examples, Ordinary and Singular Points, Series Solution Method										
<b>UNIT III</b>										<b>10</b>
Problem Systems of Linear Differential Equations: System of First Order Equations, Existence and Uniqueness Theorem, Fundamental Matrix, The eigenvalue-eigenvector method of finding solution, Non homogeneous Linear Systems, Linear Systems with Constant Coefficients,										
<b>UNIT IV</b>										<b>9</b>
Linear Systems with Periodic Coefficients, Oscillations of Second Order Equations: Sturm Comparison Theorem, Elementary Linear Oscillations, Oscillations of $x'' + a(t)x = 0$ .										
<b>APPROXIMATE TOTAL</b>										<b>39 Hours</b>
<b>OUTCOMES</b>										
<ol style="list-style-type: none"> <li>1. Able to understand the concept of existence and uniqueness of ordinary differential equations</li> <li>2. Apply the appropriate method for the solution of non-linear ordinary differential equations</li> <li>3. Solution methods of system of first order equations</li> <li>4. Analyzing solutions of various kind of differential equations</li> </ol>										
<b>TEXTS AND REFERENCES</b>										

1. Ordinary Differential Equations, by S.G. Deo, V Lakshmikantham, V Raghvendra, Tata McGraw-Hill Publishing Company Limited, Second Edition.
2. Differential Equations by Edwards and Panney, Prentice Hall, Third Edition.
3. The Solution of Ordinary Differential Equation, E.L. Ince, Ian N. Sneddon

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