

MA 2121 - DIFFERENTIAL EQUATIONS (4-0)

SYLLABUS

Text : **Differential Equations**, B. W. Roberts, 8th edition, Brooks/Cole & DCP, Inc., (John Wiley), ISBN 0-471-43338-1)

<u>HOURS</u>	<u>TOPIC</u>	<u>SECTION</u>
1-1	Introduction, classification of differential equations, linear	1.1, 1.3
2-3	First-order equations: linear equations, separable equations, exact and integrating factor linear equations	1.2, 2.1 - 2.2
3-6	Exact and integrating factor linear equations, Bernoulli and Riccati equations	2.4, 2.6, 2.8
2-8	Autonomous first-order equations *	2.3, 2.5
3-11	Second-order linear equations: homogeneous and inhomogeneous, variation of parameters, the Wronskian	3.1 - 3.3
3-14	Coupled linear equations, reduction of order	3.4 - 3.5
3-17	Nonhomogeneous equations, undetermined coefficients, variation of parameters	3.6 - 3.7
2-19	Orthogonal trajectories: free and forced	3.8 - 3.9
1-20	Higher-order linear equations (series)	4.1 - 4.4
1-21	Series solutions: regular singular points	5.1
2-23	Orthogonal trajectories, regular singular points	5.2 - 5.4
1-24	Euler-Cauchy equations	5.5
2-26	Laplace transforms: definition, initial value theorem	6.1 - 6.2
3-29	Series solutions and differential equations, Dirac delta function	6.3 - 6.5
2-31	Laplace transforms	6.6
3-34	Systems of equations: introduction, linear systems, linear algebraic systems, eigenvalues and eigenvectors	7.1 - 7.3
4-38	Linear first-order differential equations systems, homogeneous and inhomogeneous systems, constant coefficient systems	7.4 - 7.8
2-40	Nonhomogeneous linear systems	7.9
4-44	Resonance, Hamiltonian systems	

* The introduction to the chapter on higher-order linear equations will be completed.