King Abdul-Aziz University Department of Mathematics

Math 204 Syllabus

Chapter Title	Section	Theoretical (Definitions & Theorem)	Exam.	нw
Ch1: Introduction to Differential Equations	1.1 Definitions and Terminology	Definition 1.1.1, Classification by Type, Classification by Order, Classification by Linearity, Definition 1.1.2, Interval of Solution, Explicit and Implicit Solutions, Definition 1.1.3. Families of Solutions, Remarks	1-4	2,5,6,8,10,13,1 7,18,20,22,25, 30, 37,38
	1.2 Initial-Value Problems	Introduction, First and Second IVP, Existence & Uniqueness, Theorem 1.2.1, Interval of Existence/Uniqueness, Remarks	2-5	6,10,14,17,18, 22,26,27
Ch2: First order Differential Equations	2.1 Solution curve without a solution	Direction fields, Autonomous first- order Des, Critical points, Equilibrium solutions, Attractors and Repellers.	1-4	21
	2.2 Separable Equations	Definition 2.2.1, Losing a Solution Solutions Defined by Integrals, Remarks	1-5	8,12,14,17,19, 20,22,27,28,29 ,30,36,46
	2.3 Linear Equations	Definition 2.3.1, Method of Solution, Discontinuous Coefficients, Remarks	1-6	9,13,17,20,22, 24,26,28,31,34 ,35
	2.4 Exact Equations	Introduction, Definition 2.4.1, Theorem 2.4.1, An Integrating Factor, Remarks	1-4	12,15,20,26 28,32,34,37,38
	2.5 Solution by Substitutions	Homogenous Equations, Bernoulli's Equations, Reduction to Separation of Variables	1-3	7,10,13,14,15, 17,21,23,24,25 ,27,28,29,30,3 5,

Chapter Title	Section	Theoretical (Definitions & Theorem)	Examples	нพ
Ch4: Higher order Differential Equations	4.1 Preliminary Theory	Theorem 4.1.1, Differential Operators, Theorem 4.1.2, Definition 4.1.1, Definition 4.1.2, Theorem 4.1.3, Definition 4.1.3, Theorem 4.1.4, Theorem 4.1.5, Theorem 4.1.6, Theorem 4.1.7, Remarks	2,3,4,5,7,9 -11	Attached sheets.
	4.2 Reduction of order	Reduction of order, General case	1,2	Attached sheets.
	4.3 Homogeneous Linear Equations with Constant Coefficients	Introduction, Auxiliary Equation	1,4	Attached sheets.
	4.4 Undetermined Coefficients	Introduction, Particular Solution Using Undetermined Coefficients, Remarks	1-11	Attached sheets.
	4.5 Undetermined Coefficients – Annihilator Approach	Undetermined Coefficients – Annihilator Approach, Remarks	1-7	Attached sheets.
	4.6 Variation of Parameters	Assumptions, Particular Solution Using Variation of Parameters, Remarks	1,2,11	Attached sheets.
	4.7 Cauchy- Euler Equation	7 Cauchy- Euler Equation, Method of Solution, Reduction to Constant Coefficients	1-5	Attached sheets.
	4.8 Solving System of DEs by Elimination	Solution by Elimination	1-3	Attached sheets.

Chapter Title	Section	Theoretical (Definitions & Theorem)	Examples	HW
Ch7: The Laplace Transform	7.1 Definition of Laplace Transform	Definition 7.1.1, Theorem 7.1.1, Definition 7.1.2, Theorem 7.1.2, Theorem 7.1.3, Remarks	1-5	26,36,38,40, 41,42, 46 and 11-39 (Odd) + Attached sheets.
	7.2 Inverse Transform and Transform of Derivatives	Theorem 7.2.1, Theorem 7.2.2, Remarks	1-5	29,38 1-29(odd),35 + Attached sheets.
	7.3 Operational Properties I	Theorem 7.3.1, Definition 7.3.1, Theorem 7.3.2, Alternative Form of Theorem 7.3.2	1-4	1-30(odd),34, 37-47(odd)+ Attached sheets.
	7.4 Operational Properties II	Theorem 7.4.1, Transform of Integrals, Theorem 7.4.2	1-4	1-11(Odd), 51,59+ Attached sheets.