**THINK\_BS**

**ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS**

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This file contains a typical syllabus for a 1 semester course in Ordinary Differential equations, based on the textbook and suggested self-study problems

**Textbooks :** Elementary Differential Equations and Boundary Value Problems, Ed8,BoyceR.C.DiPrima.JWS

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| **Week** | **Section**  | **Subject** |
| **1**  | **1.3****2.1** | **Classification of Differential Equations****Linear Equations; Method of Integrating Factors** |
| **2** | **2.2;2.3****2.5** | **Separable Equations;Modeling with First Order Equations****Autonomous Equations and Population Dynamics** |
| **3** | **2.6****2.8** | **Exact Equations and Integrating Factors****The Existence and Uniqueness Theorem(Proof is ommited)** |
| **4** | **3.1****3.2** | **Second Order Differential eqns: Homogeneous eqns. With Const.Coeff****Fundamental Solution of Linear Homogeneous Equations** |
| **5** | **3.3;3.4** | **Linear Independence and the Wronksian;Complex Roots of the Characteristic Equation** |
| **6** | **3.5****3.6** | **Repeated Roots, Reduction of Order****Nonhomogeneous Equations: Method of Undetermined Coefficients** |
| **7** | **4.1****4.2** | **General Theory of n’th order Linear Differential Equation****Homogeneous Equations with Constant Coefficients** |
| **8** | **5.2;5.4** | **Series Solutions Near and Ordinary Point: Part 1; Regular Singular Points** |
| **9** | **6.1****6.2;6.3** | **Definition of the Laplace Transform****Solution of the Initial Value Problems; Step Functions,** |
| **10**  | **6.4;6.5** | **Solutions with Discontinuous Forcing Functions; Impulse Functions** |
| **11** | **6.6****7.3** | **The Convolution Integral****Systems of Algebraic Equations,Linear Ind. Eigenvalues, Eigenvectors.** |
| **12** | **7.4****7.5** | **Basic Theory of Systems of First Order Equations****Homogeneous Systems with Constant Coefficients** |
| **13** | **7.6;7.7** | **Complex Eigenvalues; Fundamental Matrices** |
| **14** | **7.8;7.9** | **Repeated Eigenvalues; Non-homogenous Linear Systems** |

**Homework**

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| **1.3** | **1,3,6,7,10,14,15,19,23,28,** |
| **2.1** | **1,5,8,11,13,15,20,27,38** |
| **2.2.** | **1,2,5,10,13,16,20,27,30** |
| **2.3** | **5,11,14,15,17,18,20,23,24,30** |
| **2.5** | **1,3,6,7,10,13,15,16,17,20,22** |
| **2.6** | **3,7,8,13,26,27,30** |
| **2.8** | **1,3,6** |
| **3.1** | **2,5,8,15,20,26** |
| **3.2** | **4,8,14,19,21,32** |
| **3.3** | **1,4,8,11** |
| **3.4** | **2,5,6,13,18,20,24,39** |
| **3.5** | **3,6,12,15,23,34,42** |
| **3.6** | **2,5,7,10,15,19,21,23,26** |
| **4.1** | **1,6,10,16** |
| **4.2** | **4,8,10,15,19,23,28,34,37** |
| **5.2** | **1,7,8** |
| **5.4** | **3,4,10** |
| **6.1** | **3,8,13,17** |
| **6.2** | **2,8,15,18,20,36** |
| **6.3** | **8,9,13,14,18,29,32** |
| **6.4** | **2,3,6,8,11,16** |
| **6.5** | **3,10,14** |
| **6.6** | **5,8,11,15,16,20,24** |
| **7.3** | **1,4,6,12,16,20,22** |
| **7.4** | **6** |
| **7.5** | **1,5,8,13,17,23** |
| **7.6.** | **2,4,8,15,18,22,30** |
| **7.7** | **4,5,10** |
| **7.8** | **3,6,11,16,18** |
| **7.9** | **3,5,8** |