

Bronx Community College  
of the City University of New York  
Department of Mathematics and Computer Science

**Syllabus: MTH 34** *Differential Equations* (4 credits-4 hours)

**Prerequisite: MTH 33- Calculus III**

**Text:** *Differential Equations, 3rd Ed. P. Blanchard, R. L. Devaney, G. R. Hall*

Section	Topic	Suggested Exercises
<b>1.</b>	<b>First-Order Differential Equations</b>	
1.1	Modeling via Differential Equations	p.14, 1,2,3,5,7-9,11,15,17,19-21
1.2	Analytic Technique:Separation of Variables	p.33, 1-17 odd,4,10,18,21,25-28,32,33,35,38,39
1.3	Qualitative Technique:Slope Fields	p.48, 1,2,3,7,9,11,13-18,20
1.4	Numerical Technique:Euler's method	p.63, 1,2,5,6,7,12,13,15
1.5	Existence and Uniqueness of Solutions	p.73, 1,3,5-7,12,13,15,17
1.6	Equilibria and the Phase Line	p.91, 1,3,4,5,7,13,15,17,18,23,25,29,37,43,44
1.8	Linear Equations	p.123, 1,3,5,7,11,13,17,18,21,23,29
1.9	Integrating Factors for Linear Equations	p.135, 1,3,5,9,11,20,21,23,24
	Review Exercises for Chapter 1	p.138, 1-9, 11-20, 21-43 odd, 47-49, 53,55-57
<b>2.</b>	<b>First-Order Systems</b>	
2.1	Modeling via Systems	p.164, 1-8,11-15,19-24
2.2	The Geometry of Systems	p.182, 1-5,7,9,11,12,13,15, 18,19, 21, 23-27
2.3	Analytic Methods for Special Systems	p.196, 1,4,7,10,13,14,15,19
2.4	Euler's Method for Systems	p.209, 1,4,5,7,10,14-16
	Review Exercises for Chapter 2	p.220, 1-24, 25-33 odd
<b>3.</b>	<b>Linear Systems</b>	
3.1	Properties of Linear Systems	p.252, 4,5-11 odd,14-17,19,24-25,27,28,31-35
3.2	Straight-Line Solutions	p.271, 1-7 odd,11,13,15-19,21,23
3.3	Phase Planes (Real Eigenvalues)	p.287, 1-11 odd,15,19,21,27
3.4	Complex Eigenvalues	p.304, 1-15 odd,17,19,23-26
3.5	Repeated and Zero Eigenvalues	p.321, 1-7 odd,11-15 odd,16,18,21-23
3.6	Second-order Linear Equations	p.336, 1-15 odd,21,23,26,29,34,40
3.7	The Trace-Determinant Plane	p.352, 1,2,3,5,9,11,12
	Review Exercises for Chapter 3	p.370, 1-18, 19-32 odd
<b>4.</b>	<b>Forcing and Resonance</b>	
4.1	Forced Harmonic Oscillators	p.393, 1,5,7,11,15,18-20,25,27,31,34-37,40
4.2	Sinusoidal Forcing	p.406, 1,5,9,11,13,15-19,23
4.3	Undamped Forcing and Resonance	p.418, 1,5,6,7,10,13-17 odd,21
App. B	Power Series Method	p.742, 1-17 odd
	Review Exercises for Chapter 4	p.443, 1-14, 15-27 odd
<b>5.</b>	<b>Nonlinear Systems</b>	
5.1	Nonlinear Systems	p.466, 1,3,5-7,11,17
5.2	Qualitative Analysis	p.481, 1-11 odd
<b>6.</b>	<b>Laplace Transforms</b>	
6.1	Laplace Transforms	p.571, 1-3,5-9,12,13,15,20,24,27
6.2	Discontinuous Functions	p.579, 1,2,3-9 odd,13,17,19
6.3	Second-Order Equations	p.593, 1,3,5,15,17,19-21,27,29,31,33,34
6.4	Delta Functions and Impulse Forcing	p.602, 1-9
	Review Exercises for Chapter 6	p.621, 1-17, 19-30 odd
<b>8.</b>	<b>Discrete Dynamical Systems</b>	
8.1	The Discrete Logistic Equation	p.681, 1-15 odd,25-31 odd
8.2	Fixed Points and Periodic Points	p.690, 1-13 odd