THE COLLEGE OF STATEN ISLAND
DEPARTMENT OF MATHEMATICS
COURSE OUTLINE

MTH 330: Applied Mathematics I

TEXT: Advanced Engineering Mathematics, Eighth Edition
by Peter O'Neil, Cenage Learning.

4Cr/6Hr SPRING 2018 ACP/EM

Week	Lesson	Sections	Topics	Page/Number
I	1	1.1	Introduction to Differential Equations Seperable Equations	15/1,4,11,17,22
	2	1.2 1.3	Linear Differential Equations Exact Equations	21/1,5,7,11,13 26/1,3,5,7,11,13,15
	3	1.4	Special First Order Equations	34/1,3,5,7,9,11,13
II	4	W	Existence/Uniqueness Considerations	W/3,7,9
	5	2.1 2.2.	Linear Second-Order Equations Homogeneous Constant Coefficients	43/1,3,5,7,8,11 47/1,3,5,8,10,11
	6	2.3.1	Particular Solutions to Nonhomogeneous Problem	58/1,3,5,7
III	7	2.3.2	Particular Solutions to Nonhomogeneous Problem	58/11,15,19,21
	8	2.4	The Euler Differential Equation	62/1,3,5,17
	9	W	Spring Motion: Harmonic Resonance $y'' + 16y = \cos \omega t, y(0) = 1, y'(0) = 0$	W/1,2,3,13,15-17 $\omega = 1$, $\omega = 4$, $\omega = 9$
IV	10		Review	
	11		EXAM I	
	12	3.1	The Laplace Transform	77/1,3,5,7,9,11,12,14,15
V	13	3.2	Laplace Transform Solution of Initial Value Problems	82/1,3,5,7,10,11
	14	3.3	Shifting Theorems and Heaveside Function	97/1,3,5,7,9,15,17,19
	15	3.3	Shifting Theorems (Cont'd)	97/27,31,33

NOTE: 'W' indicates material on the book's website, reached at `www.cenage.com/login`.

Week	Lesson	Sections	Topics	Page/Number
VI	16	3.4	Convolution Theorem	100/1,3,5,7,9,11,15,23
	17	3.5	Impulses: Dirac Delta Function	105/1,3,5,7
	18	10.1	Algebra and Geometry of Vectors	320/1,3,5,7,11,13
VII	19	10.2	Dot Product	327/1,3,6
		10.3	Cross Product	331/1,5,7,11,13
	20	10.4	Algebraic Structure of R^n	338/1,3,5,7,11,15 338/17,19,21,23,27
	21	11.1	Matrices	357/1,3,5,7,9,11,13,17,19,21
VIII	22	11.2	Elementary Row Operations	366/1,3,7,9,11,13,15,17,21
	23	11.3	Solution of Homogeneous Systems	372/1,3,5,7,9,13
	24	11.4	Solution of Nonhomogeneous Systems	379/1,3,5,7,9,15*
		11.5	Matrix Inverses	383/1,5,7,9,11,13
IX	25	11.6	Determinants	389/1,5,7,11,14,17
	26		Review	
			Using MATlab for manipulating matrices	HANDOUT
	27		EXAM II	
X	28	12.1	Eigenvalues and Eigenvectors	407/1,3,7,9,15,17
	29	12.2	Diagonalization	413/1,5,7,9,11,13,15
	30	12.3	Special Matrices	421/1,5,7,9,13,15,17
XI	31		Using MATlab for Diagonalization	HANDOUT
	32	13.1	Systems of ODES	437/1,3,5
	33	13.2	Solution of $\mathbf{X}' = \mathbf{A}X$, $\mathbf{A}$ constant	447/1,3,5,7,9,11,13,15,17,21
XII	34	14.1	Phase Plane	478/1,3,5,7
	35	13.4	Solution of $\mathbf{X}' = \mathbf{A}X + \mathbf{G}$, $\mathbf{A}$ constant	
		13.4.1	Variation of Parameters	457/1,3,5,7,9
	36	13.4	Solution of $\mathbf{X}' = \mathbf{A}X + \mathbf{G}$, $\mathbf{A}$ constant	
		13.4.2	Diagonalization	459/1,3,5,7,9
XIII	37		Review	
	38		EXAM III	
	39	14.2	Phase Plane: Critical Points	478/1,3,5,17
XIV	40	14.4	Linearization	Pendulum: $y'' + \delta y' + \sin y = 0$ $\delta = 0$, $\delta = 1$
	41	W	Predator-Prey Population Models	W/1,3,5
	42		Review	