Mathematics 240 Standard Version Syllabus

Topics which are reviewed from Math 114 and Math 104 are indicated in parentheses. Chapter and section references are to the third edition of Zill Cullen's "Advanced Engineering Mathematics".

(1) Linear Algebra. 3 weeks

CHAPTER 8: MATRICES	CORE PROBLEMS
(8.1) Matrix Algebra	3,12,13,15,18, 23,28,33,36,38
(8.2) Systems of Linear Algebraic Equations	5,7,9,20
(8.3) Rank of a Matrix	1,5,9,13,16,17
(8.4) Determinants	3,7,21,29
(8.5) Properties of Determinants	4,7,12,15,21, 31,33,37,39
(8.6) Inverse of a Matrix	1,5,9,11,21,25, 27,49,51
(8.6.1) Finding the Inverse	
(8.6.2) Using the Inverse to Solve Systems	
(8.7) Cramer's rule (optional)	1,9,11
(8.8) The Eigenvalue Problem	1,6,7,15,21,26
(8.12) Diagonalization (optional)	5,15,19,37

(2) Higher-Order Differential Equations. 2.5 weeks

CHAPTER 3: HIGHER ORDER DIFFERENTIAL EQUATIONS.

(3.1) Preliminary Theory: Linear Equations	1,3,7,15,18,22, 31,33,36
(3.1.1) Initial-Value and Boundary Value Problems	
(3.1.2) Homogeneous Equations	
(3.1.3) Nonhomogeneous Equations	
(3.3) Homogeneous Linear Equations with Constant Coefficients	3,15,37
(3.4) Undetermined Coefficients	1,6,17,25,27,33
(3.8) Linear Models: Initial Value Problems	3,7,17,25,31,43
(3.8.1) Spring/Mass System: Free Undamped Motion	
(3.8.2) Spring/Mass Systems:	

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                Free Damped Motion
        (3.8.3) Spring/Mass System:
                Driven Motion
(3.6) Cauchy-Euler Equation              1,9,11,15,27
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(3) Systems of Differential Equations. 2.5 weeks

CHAPTER 10: SYSTEMS OF LINEAR DIFFERENTIAL EQUATIONS
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(10.1) Preliminary Theory                5,7,13,19,25
(10.2) Homogeneous Linear Systems        5,11,16,21
        (10.2.1) Distinct Real
                 Eigenvalues
        (10.2.2) Repeated Eigenvalues
        (10.2.3) Complex Eigenvalues
(10.3) Solutions by Diagonalization      1,5,10
        (optional)
(10.4) Nonhomogeneous Linear Systems
        (optional)
        (10.4.1) Undetermined Coefficients  3,6,10
                 (optional)
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(4) Series Solutions. 1.5 weeks

CHAPTER 5: SERIES SOLUTIONS OF LINEAR DIFFERENTIAL EQUATIONS.
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(5.1) Solutions about Ordinary Points    3,9,11,15,21,31
        (5.1.1) Review of Power series
        (5.1.2) Power Series Solutions
(5.2) Solutions about Singular Points    5,11,15,21,27,33
(5.3) Special Functions                  1,5,9,11,15,18,
                                         25,33,44

        (5.3.1) Bessel Functions
        (5.3.2) Legendre Functions
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(5) Multivariable Calculus. 3.5 weeks

CHAPTER 9: VECTOR CALCULUS
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(9.1) Vector Functions                   3,7,13,15,17,23,
                                         25,29,33,39
(9.4) Partial Derivatives                13,27,33,39,49,
      (review)                           53

(9.5) Directional Derivatives            1,11,16,23,27,31
      (review)
(9.6) Tangent Planes and
      Normal Lines(review)               1,15,25,30
(9.7) Divergence and Curl                1,9,13,27,33,39
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