Dordt College Mathematics Department
MATH 204, Differential Equations

Fall, 2007

2005-06 Catalog Data:

MATH 204 Differential Equations (3 credit hours) (Fall)
An introduction to the theory and techniques of solving elementary differential equations and the use of these techniques in applied problems. Prerequisite: Mathematics 113.

Textbook:

Polking, Boggess, and Arnold, *Differential Equations*, Second Edition, Pearson Prentice-Hall, 2006. ISBN 0-13-143738-0

Instructor:

Douglas De Boer

Course Objectives and Outcomes:

Creational Structure: Students will understand numeric and mathematical aspect of creation to the extent that they are able to solve several types of differential equations including first and second-order linear differential equations (homogeneous or not) They will also use computer program(s) to get numerical solutions to differential equations.

Prerequisites by topic:

Calculus including techniques of integration, sequences, and series.

Computer use:

Matlab will be the supported development environment for writing algorithms. Matlab program "dfield" and "pplane" will be used for plotting direction fields and phase-plane plots. (These two programs are also available as Java applets.) Students are encouraged (but not always required) to use programs such as Mathcad or Matlab for homework solutions when appropriate.

Means of Evaluation:

Homework (10%), Two Tests (30% each), Final Exam (30%)

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MATH 204, Differential Equations, Outline
Fall, 2007

Dates			Class
	8/29	8/31	Introduction *Text: Chapter 1*
9/03	9/05	9/07	Fist-Order Equations—Seperable Equations *Text: Chapter 2, Sections 2.1, 2.2*
9/10	9/12	9/14	First-Order Equations—Models of Motion, Linear Equations *Text: Chapter 2, Sections 2.3, 2.4*
9/17	9/19	9/21	First-Order Equations—Mixing Problems, Exact Equations *Text: Chapter 2, Sections 2.5, 2.6*
9/24	9/26 **Fri, 9/28 Test**	9/28	First-Order Equations—Exact Equations, Initial Conditions *Text: Chapter 2, Sections 2.6, 2.7*
10/01	10/03 (no class Friday, 10/5)		First-Order Equations—Existence, Uniqueness, Stability *Text: Chapter 2, Sections 2.8, 2.9*
10/08	10/10	10/12	Modeling and Applications *Text: Chapter 3*
10/15	10/17	10/19	Second-Order Equations—Definitions, Planar Systems *Text: Chapter 4, Sections 4.1, 4.2*
10/22	10/24	10/26	Second-Order Equations—Linear Homogeneous w/ Constant Coefficients *Text: Chapter 4, Section 4.3*
10/29	10/31	11/02	Second-Order Equations—Method of Undetermined Coefficients *Text: Chapter 4.5*
11/05	11/07	11/09	The Laplace Transform—Definition and Basic Properties of *Text: Chapter 5, Sections 5.1, 5.2*
11/12	11/14 **Fri, 11/16 Test**	11/16	The Laplace Transform—Finding Inverses *Text: Chapter 5, Section 5.3*
11/19 (no class 11/21, 11/23)			The Laplace Transform—Application to Solving Differential Equations *Text: Chapter , Section 5.4*
(no class 11/26)	11/28	11/30	The Laplace Transform—Heavyside Step Function and Other Discontinuous Forcing Functions. *Text: Chapter 5 Section 5.5*
12/03	12/05	12/07	The Laplace Transform—The Delta (Impulse) Function and Convolution *Text: Chapter 5 Sections 5.6, 5.7*
12/10	12/12 (no class Fri., 12/14)		Numerical Methods *Text: Chapter 6, Section 6.1*
Monday, 12/17			Final exam, 3:30 – 5:30 p.m.

Note: Schedule may vary by up to two week in order to accommodate the dynamics of this particular cohort of students.