Department of Mathematics & Statistics
Concordia University

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MAST 330
Differential Equations
Fall 2014

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Instructor: Dr. J. Harnad, Office: LB 901-25 (SGW), Phone: (514) 848-2424, Ext. 3242
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Office Hours: Tuesdays, 11:00-12:15.

Prerequisites: MAST 214, 234, 234 or 264 or MATH 251, 252, 264 or equivalent.

Text: *Elementary Differential Equations*, 10th Edition, by William E. Boyce and Richard C. DiPrima (Wiley).

Assignments: Assignments are *very important*; they indicate the level of difficulty of the problems that the students are expected to solve and understand. Therefore, every effort should be made to do and understand them *independently*. The assignments will be corrected and a representative sample graded, with solution sets posted weekly. These grades together are worth a maximum of 10%.

Web Resources: Many excellent animated illustrations to the text are collected at the site www.wiley.com/college/boyce. Regular use of this resource is recommended.

Use of Computer Algebra System: It is optional but much recommended to install and use Maple or Mathematica. These computer tools can be used to verify and illustrate any analytical results you get while doing your assignment problems.

Calculators: Electronic communication devices (including cell phones) are not allowed in examination rooms. Only calculators approved by the Department (with a sticker attached as proof of approval) are allowed in examination rooms during mid-term and final. The preferred calculators are the **SHARP EL-531** and the **CASIO FX-300MS,** available at the Concordia Bookstore.

Tests: A midterm test covering the first six weeks will be given in week 7 (or later), weighing 30%.

Final Grade: The highest of the following:
  - 100% final exam
  - 30% midterm, 10% assignments, and 60% final exam.

Approximate schedule of topics

Week	Sections	Topics	Assignments	Due date
1	1.1 – 1.4	Solutions of some differential equations. Classification of diffrential equations.	Sec. 1.2. ##4, 6 Sec. 1.3 ##10, 12, 16, 18, 26, 28	Sept. 9
2	2.1 – 2.3	Linear equations; integrating factors. Separable equations; Modeling with first order equations.		Sept. 16
3	2.4 - 2.6	Linear and Nonlinear equations. Autonomous equations; population dynamics. Exact solutions; integration factors.		Sept. 23
4	2.7 – 2.9	Numerical approximations. Existence theorems. First order equations.		Sept. 30
5	3.1. – 3.3	Homogeneous equations, constant coefficients. Linear homogeneous equation solutions: Wronskian. Complex roots of characteristic equation.		Oct. 7
6	3.4 – 3.6	Repeated roots; reduction of order. Nonhomogeneous equations; undetermined coefficients. Variation of parameters.		Oct. 14
7	3.7 – 3.8	Mechanical and electrical vibrations. Forced vibrations.		Oct. 21
8	Chaps. 1 - 3	Midterm test, closed book		Oct. 28
9	4.1 – 4.2	General theory of nth order linear equations. Homogeneous equations with constant coefficients.		
10	4..3 – 4.4	Method of undetermined coefficients. Variation of parameters.		
5.1	5.1 – 5.3	Review of power series, Series solutions at an ordinary point.		
12	5.4 – 5.6	Euler equations. Frobenius' method. Series solutions near a regular singular point.		
13	7.4 – 7.6	Systems of first order linear equations		
14	7.7 – 7.9	Fundamental systems of solutions, Repeated eigenvalues. Nonhomogeneous systems.		