Department of Mathematics & Statistics
Concordia University

MATH 370
Differential Equations
Fall 2017

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Office Hours: TBA

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

Text: *Elementary Differential Equations and Boundary Value Problems*, 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 understand and solve. Therefore, every effort should be made to do and understand them *independently.* The assignments will be corrected and a representative sample graded (some problems may be not 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 "Faculty Approved Calculators" (**SHARP EL-531** or **CASIO FX-300MS**) are allowed in examination rooms during mid-term and final.

Test: A midterm test covering the first six weeks will be given in week 7 (or later).

Final Grade: The highest of the following:
- 90% final exam and 10% assignments.
- 30% midterm, 10% assignments, and 60% final exam.

If the grading scheme for this course includes graded assignments, a reasonable and representative subset of each assignment may be graded. Students will not be told in advance which subset of the assigned problems will be marked and should therefore attempt all assigned problems.

Approximate schedule of topics

Week	Sections	Topics
1	1.1 – 1.4	Solutions of some differential equations. Classification of differential equations.
2	2.1 – 2.3	Linear equations; integrating factors. Separable equations; Modeling with first order equations.
3	2.4 - 2.6	Linear and Nonlinear equations. Autonomous equations; population dynamics. Exact solutions; integration factors.
4	2.7 – 2.9	Numerical approximations. Existence theorems. First order equations.
5	3.1. – 3.3	Homogeneous equations, constant coefficients. Linear homogeneous equation solutions: Wronskian. Complex roots of characteristic equation.
6	3.4 – 3.6	Repeated roots; reduction of order. Nonhomogeneous equations; undetermined coefficients. Variation of parameters.
7	3.7 – 3.8	Mechanical and electrical vibrations. Forced vibrations.
8	Chaps. 1 – 3 **Midterm**	**Midterm test, closed book** **Scope:** Chapt. 1 – 3 inclusive.
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.
11	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.

Academic Integrity and the Academic Code of Conduct
This course is governed by Concordia University's policies on Academic Integrity and the Academic Code of Conduct as set forth in the Undergraduate Calendar and the Graduate Calendar. Students are expected to familiarize themselves with these policies and conduct themselves accordingly. "Concordia University has several resources available to students to better understand and uphold academic integrity. Concordia's website on academic integrity can be found at the following address, which also includes links to each Faculty and the School of Graduate Studies: concordia.ca/students/academic-integrity." *[Undergraduate Calendar, Sec 17.10.2]*