

MATH 370
Ordinary Differential Equations
Fall 2023

- Instructor:** Dr. P. Gora, Office: LB 901.17 (SGW), Phone: 848-2424, Ext. 3257
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- Class Schedule:** Tuesdays & Thursdays, 13:15-14:30.
- Office Hours:** TBA.
- Prerequisites:** MATH 251, MATH 265, or equivalent.
- Textbook:** *Elementary Differential Equations and Boundary Value Problems*, 12th Edition, by William E. Boyce and Richard C. DiPrima (Wiley).
You can use an older edition as well. The homework problems will be posted on Moodle. The 11th Edition is almost identical to the 12th, at least the chapters we will use.
The digital version of the textbook will be available at:
<https://www.co-opbookstore.ca/service/textbooks/>
The print version of the textbook will be available at:
<https://www.bkstr.com/concordiastore/home>
Note: Students should order textbooks as early as possible, especially for print versions in case books are back ordered or there are any shipping delays.
- Assignments:** **Assignments will be posted on Moodle weekly. The solutions should be submitted electronically on Moodle by the due date.** 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 not be graded), with solution sets posted weekly. These grades together are worth a maximum of 20%.
- Web Resources:** Many excellent animated illustrations of 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: Only calculators approved by the Department (with a sticker attached as proof of approval) are permitted for the class test and final examination. For a list of Approved calculators see <http://www.concordia.ca/artsci/math-stats/services.html#calculators>.

Test: A midterm test covering the first six weeks will be given in week 7 (or later). A more precise list of the material covered on the test will be announced later.

Final Exam: The final examination will be three hours long and will cover all the material in the course. The final exam is scheduled by the Examination Office.

Final Grade: The highest of the following:

- 80% final exam and 20% assignments.
- 25% midterm, 20% assignments, and 55% 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 - 1.3	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 difference 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: Chapters 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	7.4 – 7.8	Systems of First Order Linear Equations.

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: <https://www.concordia.ca/conduct/academic-integrity.html>" [Undergraduate Calendar, Sec 17.10.2]

Behaviour

All individuals participating in courses are expected to be professional and constructive throughout the course, including in their communications.

Concordia students are subject to the [Code of Rights and Responsibilities](#) which applies both when students are physically and virtually engaged in any University activity, including classes, seminars, meetings, etc. Students engaged in University activities must respect this Code when engaging with any members of the Concordia community, including faculty, staff, and students, whether such interactions are verbal or in writing, face to face or online/virtual. Failing to comply with the Code may result in charges and sanctions, as outlined in the Code.

Intellectual Property

Content belonging to instructors shared in online courses, including, but not limited to, online lectures, course notes, and video recordings of classes remain the intellectual property of the faculty member. It may not be distributed, published or broadcast, in whole or in part, without the express permission of the faculty member. Students are also forbidden to use their own means of recording any elements of an online class or lecture without express permission of the instructor. Any unauthorized sharing of course content may constitute a breach of the [Academic Code of Conduct](#) and/or the [Code of Rights and Responsibilities](#). As specified in the [Policy on Intellectual Property](#), the University does not claim any ownership of or interest in any student IP. All university members retain copyright over their work.

Extraordinary circumstances

In the event of extraordinary circumstances and pursuant to the [Academic Regulations](#) the University may modify the delivery, content, structure, forum, location and/or evaluation scheme. In the event of such extraordinary circumstances, students will be informed of the change.