

MATH 370
Differential Equations
Fall 2020

- Preface:** Due to exceptional circumstances, this course will be taught and all assessments will be done completely ONLINE. Given the subject matter and nature of this course, at least one of the exams, including the midterm and/or the final exam will be given online through the Concordia Online Exams (COLE) platform with online proctoring. For more details see the ADDENDUM at the end of this course outline.
- Instructor:** Dr. P. Gora
Email: pawel.gora@concordia.ca
- Office Hours:** Will be held using Zoom.
- Prerequisites:** MAST 214, 234, 234 or 264 or MATH 251, 252, 264 or equivalent.
- Lectures:** Lectures will be given using Zoom. The lectures will be recorded and posted on Moodle together with other materials.
- Textbook:** *Elementary Differential Equations and Boundary Value Problems*, 11th 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 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 backordered 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 be not be graded), with solution sets posted weekly. These grades together are worth a maximum of 20%.

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: Only “Faculty Approved Calculators” (SHARP EL-531 or CASIO FX-300MS) should be used during mid-term and final.

Test: A midterm test covering the first six weeks will be given in week 7 (or later). A precise form of the test will be announced later (see Addendum on page 3).

Final Exam: The final examination will be online two hours long and will cover all the material in the course. A precise form of the final exam will be announced later (see Addendum on page 3).

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

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](#).

Disclaimer: In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in the course is subject to change.

Addendum: This course will be taught and all assessments will be completely online. A midterm and/or a final online exam will be provided through the Concordia Online Exams (COLE) platform with online proctoring (also known as auto-proctoring). More information about the COLE system may be found at the [COLE website](#).

Please note the following respect to online proctored exams:

- That the exam will take place during the exam period at the designated date and time set by the professor (midterm) or the Exams office (final). All exam times will be set to Eastern Standard/Daylight Time.
- That your image, voice and screen activity will be recorded throughout the duration of the exam.
- That you must show your Concordia University Identification card to validate your identity. Alternative government issued photo

identification will be accepted, though it is not recommended. Only identification in English or French will be accepted.

- That any recording made will only be viewed by authorized university personnel (no external entity has authorization to review the recording).
- That you will be responsible for ensuring appropriate, properly functioning technology (webcam, a microphone, appropriate browser and an ability to download any necessary software, as well as a reliable internet connection with a minimum of a 3G connection).
- That you are very **strongly recommended** to enter the virtual test site found at the [COLE website](#) and become familiar with the software that will be used for your exam before starting the exam.
- That you will need a quiet place within which to take the exam. Earplugs or noise-cancelling headphones that are not connected to a device may also be used to allow you to focus for the duration of the exam.

Students who are unable to write an exam because they are unable to meet the above conditions and requirements are advised that they will need to drop the course. More information can be provided on the next offering of this course by consulting the Department. Students are advised that the drop deadline (DNE) for this course is September 21, 2020.

Students who require additional accommodations for their exams due to a documented disability should contact the Access Centre for Students with Disabilities as soon as possible (acsinfo@concordia.ca).

If you face issues during the exam, you should inform your professor of those issues immediately. Please note that there are in-exam supports you should spend time getting to know. Visit the [COLE website](#) for more information.