

MATH 2120: METHODS FOR ORDINARY DIFFERENTIAL EQUATIONS

Summer 2020

Instructor:	Chunyi Gai	Time:	MW 18:05 – 20:55
Email:	chunyi.gai@dal.ca	Place:	Distance.
Office Hour:	Tue and Thur 1PM to 2PM		

Course Description:

- A comprehensive introduction to the theory of ordinary differential equations (ODEs), which is a broad field in pure and applied mathematics with numerous applications in other sciences.
- The topics include: special types of ODEs of 1st order, homogeneous and inhomogeneous linear ODEs with constant coefficients, Laplace transforms, systems of ODEs.

Prerequisites: An undergraduate-level understanding of calculus, and linear algebra is assumed.

Course Materials:

- **Textbook:** [Notes on Diffy Qs: Differential Equations for Engineers](#), by Jiri Lebl (free online.)
- **Course website on Brightspace** is accessed through dal.brightspace.com. Please check Brightspace on a daily basis for any updates.
- **Asynchronous online lectures:** All lectures will be recorded and uploaded through Brightspace at 6PM on Monday and Wednesday. Although you don't have to watch the videos during class time, you are responsible to work through it and finish assignments on time.
- **Online office hours:** You can reach me on Collaborate Ultra (link will be provided in Brightspace) from 1pm to 2pm on each Tuesday and Thursday. Any course-related questions are welcome.
- **Discussion boards:** If you have questions at other time, please submit them on the Discussions Board on Brightspace.

Evaluation: The evaluation will consist of assignments and 3 in-class quizzes. The weight of each part is: Homework (40%), Quiz 1-3 (60%).

- **Assignments** are given online using Brightspace. Assignments will open on Monday and Wednesday noon and close before next Assignment (Due days are shown in Course schedule).
- **Quizzes.** There will be 3 in-class quizzes held on Webwork. Textbook, course notes and calculators are not permitted.

Important Dates:

Quiz 1 May 20 (Wednesday) 6PM - 9PM (Atlantic Time Canada)
Quiz 2 June 3 (Wednesday) 6PM - 9PM (Atlantic Time Canada)
Quiz 3 June 29 (Monday) 6PM - 9PM (Atlantic Time Canada)

Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale:

A+ [90-100], A [85-90), A- [80-85), B+ [77-80), B [73-77), B- [70,73),
C+ [65-70), C [60-65), C- [55-60), D [50-55), F [0-50).

Course Policy:

- Late assignments will not be accepted.
- A missed quiz cannot be written at another time. If you miss the quizzes without **prior** permission, it will be counted as 0. Exceptions are made in the case that you have an officially valid excuse such as a medical doctor's note (you **must** notify the instructor **prior** to the quiz (minimum of one hour), and provide a medical note).

University Policies and Statements: See Brightspace for Part B of this syllabus for these Policies.

Course Schedule:

May 11 (M)	1.1-1.4: Introduction; Solve first order ODE: Separable and linear equations
May 13 (W)	1.5-1.8: First order ODEs: Substitution; Autonomous equations (Assignment 1 due)
May 18 (M)	Victoria's Day (Assignment 2 due)
May 20 (W)	Quiz 1
May 25 (M)	2.1-2.3: Second order linear ODEs (homogeneous) and higher order linear equations
May 27 (W)	2.4-2.5: Applications; Non-homogeneous equations (Assignment 3 due)
June 1 (M)	2.5-2.6: Non-homogeneous equations and applications (Assignment 4 due)
June 3 (W)	Quiz 2
June 8 (M)	3.1-3.3: Matrices; Linear system of ODEs (Assignment 5 due)
June 10 (W)	3.4-3.5: Eigenvalue method; Vector fields and stability analysis (Assignment 6 due)
June 15 (M)	3.6-3.7: Second order systems and applications; Multiple eigenvalues (Assignment 7 due)
June 17 (W)	3.8-3.9: Matrix exponentials; Nonhomogeneous systems (Assignment 8 due)
June 22 (M)	6.1-6.2: The Laplace transform; Transforms of derivatives and ODEs (Assignment 9 due)
June 24 (W)	6.3-6.4: Convolution; Dirac delta function (Assignment 10 due)
June 29 (M)	Quiz 3 (Assignment 11 due)