Faculty of Science Course Syllabus
Department of Mathematics and Statistics
MATH 2120 – Methods for Ordinary Differential Equations
Summer-A 2023/24
Section A

1 General Information

Greetings, my name is Jonathan Tot, and I'll be your Instructor for MATH 2120 this Summer-A 2023/24. I'm a Mathematics PhD student, working under Prof. Alan Coley in Relativity and Cosmology.

For any questions or assistance, you can contact me by email jonathan.tot@dal.ca, or message via the course Brightspace page.

Course Description: This course is 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.

Online Synchronous Classes: The course material will be taught in synchronous online lectures MWF 9:05-10:55am, starting May 6th and concluding June 21th. We will meet together using **Collaborate Ultra** which is accessed on the course Brightspace page. We will have a 5-10min break around halfway through these sessions, to allow us to stretch our legs, maybe take a few steps outside if you're able, and allow for some time to process the material.

These lectures will be video-recorded and later uploaded to Brightspace, as will be the lecture notes for these sessions.

Prerequisites: Math 1010 or Instructor permission.

Textbook: For this course we will be following '*Notes on Diffy Qs*', a set of course notes by Jiří Lebl.

Calculators: Calculators will not be needed, and not permitted for the final exam. Answers may be left unsimplified, though I would encourage you to practice simplifying an expression so that you can become comfortable to do so.

2 Student Supports

Student Hours and Discussion Board: I will be available for Student Hours a total of six (6) hours each week via Collaborate: Tuesdays 10am–12pm, Thursdays 3–5pm, and Fridays 1–3pm (Atlantic Time). There will also be Discussion Boards on Brightspace, where you will be able to ask either admin- or content-related questions. Our TA, Peter Collier, will also be available for Student Hours, which will be announced on Brightspace.

The **MATH/STAT Learning Centre** will be providing their assistance remotely Monday to Friday, 12–4pm Atlantic Time. Register for the Brightspace page at `https://www.dal.ca/faculty/science/math-stats/about/learning-centre.html` to access the online support and see the latest schedule.

3 Course Assessment

WebWork homework You will have ten (10) homework Assignments to be completed on WebWork, accessible through Brightspace. The lowest grade of these will be dropped. In total, the Assignments will count for 40% of the final evaluation for this course.

Midterm Test We will have an online Midterm test, made available on Brightspace on May 24th, covering the first two sections of the course. This Midterm will be entirely open book, and you will have a week to complete it and submit solutions to Brightspace, but the Midterm will not be counted toward your final grade. Rather, you should view the Midterm test as an opportunity to practice answering exam-style questions (for the Exam you will have to answer some long-form question, showing your work), and to get feedback on your learning and comprehension at that stage in the course.

Final Exam The Final Exam, 60% of the evaluation of the course, will take place **in-person** during our last scheduled class time together, Friday June 21st 9am-12pm. The location is the Potter Auditorium (r.1028) of the Rowe Management Building. If you will not be able to be physically on campus at that time, there is a make-up exam scheduled for August 26th, 4–7pm in the MacMechan Auditorium of the Killam Library. If at all possible, I highly encourage you to plan to attend the main exam sitting in June, so as to have a back-up in case of emergency.

Assessment Breakdown:

WebWork Assignments	40%
Midterm	0%
Final Exam	60%

The grading scheme for this course will follow the standard scale set by Dalhousie University. `https://www.dal.ca/campus_life/academic-support/grades-and-student-records/grade-scale-and-definitions.html`

4 Course topics and approximate schedule

We will be covering four chapters of the course text; those being Chapters 1, 2, 3, and parts of 6. We will refer to these Sections 1, 2, 3 and 4 of the course. In Section 1, we have introduction to ordinary differential equations (ODEs), including study of several important types of first order ODEs. In Section 2 will study linear differential equations in detail. Section 3 focus on systems of linear ODEs, and in Section 4 we will study how we can we can analyze ODEs with the Laplace Transform.

The following table shows the schedule for the Sections and WebWork Assignment due dates. The problem sets will be available 1 week before they are due, opening 12:00am Atlantic time on these dates, and they will be due at 11:59pm of the same day the following week.

Week				Lectures
1	May 6	A1 available	May 6	begin Section 1
			May 8	
	May 10	A2 available	May 10	
2	May 13	A1 due	May 13	
	May 14	A3 available	May 15	begin Section 2
	May 19	A2 due, A4 available	May 17	
3	May 21	A3 due	May 20	Victoria Day (campus closed), no lecture
	May 22	A5 available	May 22	
	May 24	A4 due	May 24	Midterm available on Brightspace
4	May 27	A6 available	May 27	begin Section 3
	May 29	A5 due	May 29	
	May 30	A7 available	May 31	Midterm due for feedback
5	June 3	A6 due, A8 available	June 3	
	June 6	A7 due	June 5	
	June 7	A9 available	June 7	
6	June 10	A8 due	June 10	begin Section 4, Laplace Transforms
	June 11	A10 available	June 12	
	June 14	A9 due	June 14	
7	June 18	A10 due	June 17	Review 1
			June 19	Review 2
			June 21	Final Exam (in person)

5 Metacognition & Growth Mindset

It is good, from time to time, for us to think about *how we are thinking and learning*; this is called metacognition. To that end, I will post on Brightspace a short set of questions that you can use to reflect on your progress. You could

do this after each Section, after completing Homework sets, or after you have feedback on your Midterm solutions, for example.

Related to this, there is evidence [1] that shows our frame of mind can greatly impact success. In particular, if you have a growth mindset (you believe that with practice your abilities can improve) you are often more successful than if you have a fixed mindset (you believe that you can either do or not do something). I invite you to take a growth mindset to mathematics: with regular practice, you will improve your skills.

6   Student Accommodations

Students may request accommodation as a result of barriers related to disability, religious obligation, or any characteristic under the Nova Scotia Human Rights Act. Students who require academic accommodation for either classroom participation or the writing of tests, quizzes and exams should make their request to the Office of Student Accessibility & Accommodation (OSAA) prior to or at the outset of each academic term. Please visit `https://www.dal.ca/campus_life/academic-support/accessibility.html` for more information and to obtain Form A - Request for Accommodation. A note taker may be required to assist a classmate. There is an honorarium provided for the note taker of $75-100/course/term. If you are interested, please contact OSAA at access@dal.ca or 494-2836 for more information.

7   Course Policies related to Academic Integrity

You are strongly encouraged to collaborate with other students when working on homework and studying for your exams. Submitting your homework online should be done independently, so that your individual learning may be assessed. You can use the Discussion board on Brightspace to meet your colleagues, potentially join with others as a study group if you would like to.

8   Course Policies on missed or late academic requirements

In the event that you are absent for three days or fewer resulting in missed or late academic requirements, you will be required to submit a Student Declaration of Absence Form to your instructor, see:
`https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/academic-policies/student-absence.html`
In the event that you are unable to participate in our Final Exam, please notify me by email as soon as possible, to determine what alternatives may be possible.
Late homework will not be accepted except with the instructors prior permission.

Dalhousie University sits on the ancestral and unceded territory of the Mi'kmaq nation. We are all Treaty people.

We acknowledge the history, contributions, and legacy of African Nova Scotians; people and communities who have been here for over 400 years.

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[1]Dweck, C. S. (2006). Mindset: The new psychology of success. Random House.