

**MATH 334 (A1) Introduction to Differential Equations**  
**Fall, 2020**

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Instructor:	Dr. Michael Li, <a href="mailto:myli@ualberta.ca">myli@ualberta.ca</a>	Office: CAB 643, <a href="http://www.ualberta.ca/~myli">http://www.ualberta.ca/~myli</a>
Time of Class:	No live classes. Lecture notes are posted on eClass website	
Textbook:	Elementary Differential Equations and Boundary Value Problems, 11 <sup>th</sup> Ed, by W. E. Boyce and R. C. DiPrima	
Office Hours:	Office hours will be online (Zoom). Mondays: 6:00-8:00 pm, Thursdays: 6:00-7:00 pm (Edmonton time)	
Homework:	Weekly homework assignments and solutions will be posted on the e-Class website of the course. Homework assignments are due on Fridays before 5:00 pm (Edmonton time) on Assign 2.  <b>Note:</b> Some of you might have used CrowdMark for homework submission in the past. For cost-saving reasons, we will use Assign2 this term for homework submission.	
Exams:	Midterm:      October 14, Wednesday, online. Time: TBA Final Exam:   December 14, Monday, online. Time: TBA	
Final Grades:	Your final grade in percentage will be calculated according to the formula:  $15\% \text{ Homework} + 35\% \text{ Midterms} + 50\% \text{ Final Exam},$ based on which letter grades will be decided.	
Calculators:	In fairness to all students, calculators and electronic devices of any sort, formula sheets and tables are <b>NOT</b> permitted for either midterm or final exam.	
Excused absence:	Excused absences and deferred exams are intended to accommodate students who experienced an incapacitating illness or severe domestic affliction. Applications based on minor or inconsequential ailments or circumstances will not be approved. As of December 18, 2009, new calendar changes eliminate the requirement for medical documentation for any type of illness. If an excused absence from the Mid-term exam is granted, the weight for the midterm will be added to the Final Exam. Deferred Final Exam needs approval from The Faculty of Science.	
Deferred Final Exam:	Saturday, January 9, 2021, 9:00 am (Edmonton time)	
Location:	Delivered remotely.	

## TENTATIVE COURSE SCHEDULE

Week/Date	Section	Topic	
1. Sept. 1-4	1.1	Basic mathematical models	
	1.2	Solutions of differential equations	
	1.3	Classification of differential equations	
2. Sept. 7-11	2.1	Linear differential equations	
	2.2	Separable equations	
	2.3-2.5	Modeling using 1 <sup>st</sup> order differential equations	
	2.6	Exact equations	
3. Sept. 14-18	2.7	Numerical methods	
	2.8	Existence and uniqueness theorems	
	3.1	Homogeneous equations with constant coefficients	1-
4. Sept. 21-25	3.2	The Wronskian	
	3.3-3.4	Characteristic roots: complex roots and repeated roots	
	3.5	Nonhomogeneous equations: Undetermined coefficients	
5. Sept. 28-Oct. 2	3.6	Nonhomogeneous equations: Variation of parameters	
	3.7-3.8	Mechanical systems	
	4.1	Higher order linear differential equations	
	4.2	Homogeneous equations of constant coefficients	
6. Oct. 5-9	4.3	Non-homogeneous linear equations: undetermined coefficients	
	4.4	Non-homogeneous linear equations: variation of parameters	
7. Oct. 12-16	<b>Midterm Exam (Wednesday, October 14, time TBA, online)</b>		
	5.1	Review of power series	
	5.2-5.3	Series solutions near ordinary points	
8. Oct. 19-23	5.4	Euler equations	
	5.5-5.6	Solutions near regular singular points	
	5.7	Bessel's equations	
9. Oct. 26-30	6.1	Laplace transforms and inverse transforms	
	6.2	Solving initial value problems using Laplace transforms	
	6.3	Transform of step functions	
10. Nov. 2-6	6.4	Differential equations with discontinuous forcing functions	
	6.5	Impulse functions	
	6.6	Convolution	
11. Nov. 9-13	<b>Fall term reading week, no classes</b>		
12. Nov 16-20	7.4	First order linear systems	
	7.5	Homogeneous systems of constant coefficients	
	7.6	Complex eigenvalues	
13. Nov. 23-27	7.7	Fundamental matrices	
	7.8	Repeated eigenvalues	
14. Nov. 30-Dec. 7	7.9	Nonhomogeneous equations	
	Review		
December 11	<b>Final Exam</b>	(December 11, Monday, online. Time: TBA)	