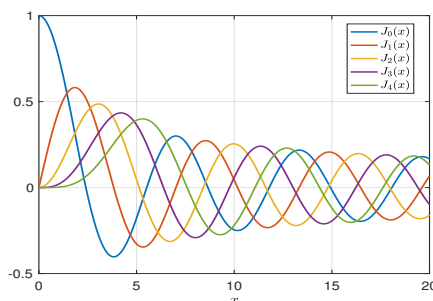


## MATH 370: Ordinary Differential Equations (Fall 2022)

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**Instructor:** Jason Bramburger  
**Email Address:** jason.bramburger@concordia.ca  
**Instructor Office:** LB 901-21  
**Lectures:** Tuesday/Thursday 1:15 - 2:30 pm  
**Office Hours:** Wednesday 1:00 - 4:00 pm, LB 759-06  
Virtual: by appointment only  
**Course Website:** Moodle



### Course Topics and Goals

Over the semester students will be taught to recognize, interpret, and solve various differential equations and boundary value problems. Course topics include separable equations, exact equations, integrating factors, first order linear equations, second order equations, applications of differential equations, series solutions, reduction of order, variation of parameters, the Laplace transform, and higher-order linear equations with constant coefficients.

### Prerequisites

MATH 265, MATH 251 or equivalent.

### Textbook

*Elementary Differential Equations and Boundary Value Problems*, 10th Edition, by William E. Boyce and Richard C. DiPrima (Wiley).

\* We will cover most of chapters 1 through 6 of the textbook.

\*\* You can use an older edition as well. The homework problems will be posted on Moodle and the textbook organization/content doesn't seem to change much between editions.

### Instruction

Lectures will be held in-person at the times stated above. I will also post lightboard video lectures to [my YouTube channel](#) that can be used to prepare for or review class material. If you are feeling ill in any way you are encouraged to stay home and use the lecture videos to keep up-to-date with the course. You are strongly encouraged to attend class as the videos are only meant to be supplementary material and therefore may not contain everything that is covered in lecture.

### Assessment

Your grade in this course will be assigned according to whichever of the two percent systems below result in the highest grade:

50% Final Exam  
30% Midterm  
20% Assignments

or

80% Final Exam  
20% Assignments

### Assignments

There will be weekly assignments. 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 graded), with solution sets posted after the due date. Late assignments will **not** be accepted

without a legitimate excuse and prior approval.

### **Tests**

This course will have a midterm test and final examination. The midterm will cover material from chapters 1-3 (inclusively) and will take place in class on **October 27, 2022**. The final exam will cover all material covered in the course.

### **Web Resources**

The textbook publisher, Wiley, operates an excellent web resource that accompanies the textbook, which includes many animated illustrations of the textbook concepts. They can be found at [www.wiley.com/college/boyce](http://www.wiley.com/college/boyce) and regular use of this resource is highly recommended.

### **Calculators**

Electronic communication devices (including cell phones) are not permitted in examination rooms. Only “**Faculty Approved Calculators**” (**SHARP EL-531** or **CASIO FX-300MS**) are allowed in examination rooms during midterm and final examinations.

### **Accommodations for Students with Disabilities**

If you need accommodations for classes, assignments, or exams, please contact me and the Access Center for Students with Disabilities. Website: <https://www.concordia.ca/students/accessibility.html>.

### **Counselling and Psychological Services**

Counselling and Psychological Services offers short-term counselling to registered Concordia students who are in Quebec. Appointments can be either virtual and in-person. Website: <https://www.concordia.ca/health/mental-health/counselling.html>.

### **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. Concordias website on academic integrity can be found at the following address, which also includes links to each Faculty and the School of Graduate Studies: [concordia.ca/students/academic-integrity](http://concordia.ca/students/academic-integrity).” [Undergraduate Calendar, Sec 17.10.2]

### **Diversity and Inclusion Statement**

Concordia University is an intentionally inclusive community that promotes and maintains an equitable and just work and learning environment. We welcome and value individuals and their differences including race, economic status, gender expression and identity, sex, sexual orientation, ethnicity, national origin, first language, religion, age, and disability. I invite and respect any concerns about inequitable access or treatment in this course.

I strive to create a learning environment for you that supports a diversity of thoughts, perspectives, and experiences, and honours your identities. To help accomplish this:

- If you have a name and/or set of pronouns that differ from those that appear in your official Concordia records, you are encouraged to let me know.
- If you feel your performance in the course is being impacted by your experiences outside of class, please come talk with me.
- I am still in the process of learning about inclusion, diverse perspectives, and identities. If something was said in class (by anyone, including me) that made you feel uncomfortable, please talk to me about it.
- As a participant in course discussion and problem-based sessions, you should strive to honour the diversity of your classmates.

## Additional Course Policies

- All announcements will be posted on Moodle. Be sure your Moodle notifications are turned on, and you check it regularly.
- I am here to facilitate your learning; let me know if you have questions! I can always be reached by e-mail, and can schedule additional office hours should you need them.

## Approximate Schedule:

Week of	Sections Covered	Topic
September 5	1.1 - 1.4	Solutions of some differential equations. Classification of differential equations.
September 12	2.1 - 2.3	Linear equations; integrating factors. Separable equations; Modeling with first order equations.
September 19	2.4 - 2.6	Linear and nonlinear equations. Autonomous equations; population dynamics. Exact solutions; integrating factors.
September 26	2.7 - 2.9	Numerical approximations. Existence theorems. First order equations.
October 3	3.1 - 3.3	Homogeneous equations, constant coefficients. Linear homogeneous equation solutions: Wronskian. Complex roots of characteristic equation.
October 10	3.4 - 3.6	Repeated roots; reduction of order. Nonhomogeneous equations; undetermined coefficients. Variation of parameters.
October 17	3.7 - 3.8	Mechanical and electrical vibrations. Forced vibrations.
October 24	<b>Midterm</b>	Tuesday: catch-up and finish Chapter 3. Thursday: Midterm. Midterm scope: Chapters 1-3 inclusive.
October 31	4.1 - 4.2	General theory of $n$ th order linear equations. Homogeneous equations with constant coefficients.
November 7	4.3, 4.4, 5.1	Method of undetermined coefficients. Variation of parameters. Review of Power Series
November 14	5.2 - 5.3	Series solutions at an ordinary point.
November 21	5.4 - 5.6	Euler equations. Frobenius' method. Series solutions near a regular singular point.
November 28	6.1 - 6.2	The Laplace transform. Solutions to initial value problems.
December 5	6.3	Catch-up and more Laplace transform. (Only class on Tuesday)
<b>December XX</b>		<b>FINAL EXAM</b> (All Sections)