

MATH-3111-FDE PARTIAL DIFFERENTIAL EQUATIONS I
MATH-3131-FDE METHODS MATH PHYSICS I
FALL 2021

Instructor: Prof. Xin Yang LU

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Classes: TTh 5.30-7.00pm. Synchronous delivery via Zoom. Lectures will be recorded, and made available on D2L, so you can access those later. Attendance has no impact on the final grade. To see how to access the Zoom lectures, see “Zoom Instructions” below.

Office Hours: To be held via Zoom. Scheduled by appointment via email

DESCRIPTION

- **Textbook:** *Mathematical Methods for Physics and Engineering*, 3rd edition by Riley, Hobson, and Bence. Recommended but not required.
 - We will cover the following topics:
 - Recalling preliminary notions: vector spaces, inner products, norms, matrices, linear applications, change of basis, Gram-Schmidt process, Complex numbers.
 - Fourier transform.
 - Using Fourier transform to solve ODEs/PDEs.
 - Laplace transform.
 - Using Laplace transform to solve ODEs/PDEs.
 - Banach and Hilbert spaces.
 - Differential operators.
 - Eigenvalues/Eigenfunctions.
 - Sturm-Liouville equations.
 - Fundamental solutions and Superposition principle.
 - Legendre/Associated Legendre equations.
 - Spherical harmonics.
 - Chebyshev equation.
 - Bessel equation.
 - Laguerre/Associated Laguerre equations.
 - Hermite equation.
- **Assignments:** 2 assignments during the semester, each one counting for 20% of the final grade. You will have 1 week to do each assignment.
- **Final Exam:** There will be a formal 3 hours final exam which will count for 60% of the final grade. There will be *NO* 100% final option. Exams will be posted on D2L at the start, and then you will have to send back scans of your work within 10 minutes after the end of the scheduled exam time.
- **Policies:**
 - Important announcements will be made through D2L to registered students via D2L. You are responsible for reading the info posted on D2L.
 - I attempt to reply to e-mail in a timely fashion, but do not expect immediate responses.
- **Academic Dishonesty:** All cases of academic dishonesty will be dealt with according to the university’s Code of Student Behavior and Disciplinary Procedures, copies of which are available from the university’s web-site.
- **Accommodations:** Lakehead University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. If you think you may need accommodations, you are strongly encouraged to contact Student Accessibility Services (SAS) and register as early as possible. For more information, please visit: <http://studentaccessibility.lakeheadu.ca>

ZOOM INSTRUCTIONS

In order to access Zoom lectures, follow the steps below:

- (1) Go to the D2L page of this course.
- (2) Click on "Other Tools" (top right of the page).
- (3) A scroll-down menu will appear, scroll all the way down and click on "Zoom".
- (4) You will be directed to the "Upcoming Meetings" page in Zoom. All upcoming lectures are listed here. Click to join. Please mute your microphone.