

The Chinese University of Hong Kong
MATH 5021 — Theory of PDEs I

1. GENERAL INFORMATION.

Instructor: Chenyun Luo.

Office: LSB 213.

Instructor's email: cluo@math.cuhk.edu.hk.

Lecture time and location: W, 2:30 am–5:15 pm in LSB 219.

2. COURSE INFORMATION.

We will discuss the classical theory of hyperbolic PDEs. Topics include linear hyperbolic equations, Lorentzian geometry, semilinear and quasilinear wave equations, and other related topics. Students are expected to know multivariable calculus, graduate-level real analysis, and undergraduate-level PDE (e.g., Evans Chapters 1–7) before taking this course. Prior exposure to differential geometry is recommended but not required.

2.1. **Textbook.** No textbook is required. All lectures will be conducted based on the instructor's notes.

2.2. **Reference.**

- *Partial Differential Equations I–III*, by M. Taylor.
- *Nonlinear Dispersive Equations*, by T. Tao.
- *Introduction to Nonlinear Wave Equations*, by J. Luk.
- *Lectures on Nonlinear Hyperbolic Differential Equations*, by L. Hörmander.
- *Geometric Analysis of Hyperbolic Differential Equations: An Introduction*, by S. Alinhac.

3. COURSEWORK

There will be an (optional) final project (a short report ≤ 5 pages on a PDE-related topic) and a final examination (location and time TBA). Should a student choose to submit the final project, the deadline is **Wednesday, December 6, 2023, by noon**.

4. GRADING POLICY.

Each student's performance will be evaluated based on the following criteria:

- (1) Attendance 10%, Project 45%, Final exam 45%, or
- (2) Attendance 10%, Final exam 90%.