

SYLLABUS Spring 2024

The University of Iowa
The College of Liberal Arts and Sciences
Department of Mathematics

MATH:5700:0001 Intro to Partial Differential Equations

Time/Days/Location: **1:30P - 2:20P MWF 105 [MLH](#)**

Instructor: [Lihe Wang](#)

Office location and office hours: [225B MLH](#)

Office hours: [10:30-11:30 MWF in person or online, or by appointment](#). Join

URL: <https://uiowa.zoom.us/j/98374030833>

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Teaching Assistant: Jose Beltran Lizarazo, 269 MH, jose-beltranlizarazo@uiowa.edu

Problem Sessions:

Some of the policies relating to this course (such as the drop deadline) are governed by its administrative home, the College of Liberal Arts and Sciences, 120 Schaeffer Hall.

Description of Course: This course is an introduction to partial differential equations. Topics to be covered include Laplace and wave equations, scalar conservation laws, weak solutions and energy methods, the fundamental solutions, the Green function, separation of variables, the method of characteristics, and other selected topics.

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Objectives and Goals of the Course

- a. Mathematical Modelling
- b. Partial Differential Equations
- c. The Diffusion Equation
- d. The Laplace Equation
- e. Wave equations
- f. Scalar Conservation Laws and First Order Equations
- g. Weak solutions and variational methods

Text: Sandro Salsa: Partial Differential Equations in Action, From Modelling to Theory, 3rd, edition, Springer, 2016. ISBN 10: [3319312375](#) / ISBN 13: [9783319312378](#)

MATERIAL TO BE COVERED:

Chapter 1. Introduction to PDE, classification of solutions.

Chapter 2. 2.1-2.3& 2.8 (7 lectures)

Chapter 3. 3.1-3.3, 3.6-7 (harmonic functions, fundamental solution, Poisson Kernel) (6 lectures)

Chapter 4. (4.2,4.4-6) (6 lectures), transport equation, characteristics, weak solution, rarefaction and shock waves, entropy solutions

Chapter 5. (5.3,5.4, 5.6, 5.8) courses 6 lectures, minimal up to 5.5, test only one-dimensional)

Chapter 7. 7.1, 7.2, 7.3 7.7, 7.10. (about 6 lectures)

Chapter 8. Upto 8.5. (about 6 lectures) .

Grading System: Plus/minus grading will be used.

30%	2 midterms
50%	Final exam
20%	Homework weekly

ALL EXAMS ARE COMPREHENSIVE unless specified otherwise.

As the class progresses, all grades will be recorded on ICON.

I will use the +/- grading system. Cutoffs for the letter grade are expected to follow the recommended scale given by CLAS below, and cutoffs for +/- are at the discretion of the instructor. You should not view this as a predetermined grade scale for assigning the final grade, but rather as a guaranteed minimum grading scale.

A [100,93); A- [90,93)

B+ [87,90); B [83,87); B- [80,83)

C+ [77,80); C [73,77); C- [70,73)

D+ [67,70); D [63,67); D- [40,63)

F [0, 40)

Grade cuts and Grade Distribution: Two midterms and the final exam are going to be common exams for all sections, and the grades will be determined by the curve called Norm-Referenced Grading for intermediate level courses recommended by College of Liberal Arts and Sciences.

Calculators and other electronic devices are not allowed during the exams.

Midterm Exams:

MIDTERM 1: 03/06/2024, Wednesday

MIDTERM 2: 04/17/2024, Wednesday

Final Examination: TBA

Date and Time of the Final Exam:

The final examination date and time will be announced by the Registrar generally by the tenth day of classes. All students should plan on being at the UI through the final examination period. Once the Registrar has announced the date, time, and location of each final exam, the complete schedule will be published on the Registrar's web site and will be shared with instructors and students. Do not make your end of the semester travel plans until the final exam schedule is made public. It is the student's responsibility to know the date, time, and place of the final exam.

<http://registrar.uiowa.edu/final-exam-schedules>

Course Policies:

Course attendance: Students are expected to attend every class. Absences may affect your grade.

Rules on Student Collaboration: *In this class, students are allowed to talk with others about homework. However, do not share your written work with others or ask others to see their completed assignments since both are considered academic misconduct. In other words, you can discuss a problem with other students, but you write your solution alone. If you worked/discussed a problem with others, you must state their names on your homework before the beginning of that problem, even if you wrote the solution yourself. HWs showing duplication will be considered as the result of academic dishonesty. If you need help, please stop by during my office hours. Students are responsible for understanding this policy; if you have questions, ask for clarification.*

Academic Honesty and Misconduct

All students in CLAS courses are expected to abide by the [CLAS Code of Academic Honesty](#). Undergraduate academic misconduct must be reported by instructors to CLAS according to [these procedures](#). Graduate academic misconduct must be reported to the Graduate College according to Section F of the [Graduate College Manual](#).

Student Complaints

Students with a complaint about a grade or a related matter should first discuss the situation with the instructor and/or the course supervisor (if applicable), and finally with the Director or Chair of the school, department, or program offering the course. Undergraduate students should contact [CLAS Undergraduate Programs](#) for support when the matter is not resolved at the previous level. Graduate students should contact the CLAS [Associate Dean for Graduate Education](#) and Outreach and Engagement when additional support is needed.

Drop Deadline for this Course

You may drop an individual course before the deadline; after this deadline you will need collegiate approval. You can look up the [drop deadline for this course](#) here. When you drop a course, a "W" will appear on your transcript. The mark of "W" is a neutral mark that does not affect your GPA. Directions for adding or dropping a course and other registration changes can be found on the [Registrar's website](#). Undergraduate students can find policies

on dropping CLAS courses [here](#). Graduate students should adhere to the [academic deadlines](#) and policies set by the Graduate College.

Attendance and Absences

Instructors: Describe all attendance, absence, and late work policies in detail. Be as clear as possible about the absence policy for the course and consider asking students to use the absence form on ICON under Student Tools. CLAS recommends that departments regularly discuss and agree upon, when appropriate, reasonable attendance guidelines for courses depending on the level, scope, and role of course in departmental curriculum. CLAS also encourages instructors to consider flexible absence policies. *You can find CLAS guidance on absences [here](#).*

[University regulations require that students be allowed to make up examinations](#) that have been missed due to illness, religious holy days, military service obligations (including service-related medical appointments), or other unavoidable circumstances or University-sponsored activities. *Students with UI-authorized activities must discuss their absences with the instructor as soon as possible. Religious obligations must be communicated within the first three weeks of classes.*

Other Expectations of Student Performance [optional]

Some instructors include expectations for civil behavior and consequences for any disturbances of the class, especially for those involving technology, which can distract those students sitting by the user. Students have the right to a distraction-free learning environment. Please also stress that students are expected to help each other learn and to contribute overall to the learning environment of the course. Arriving prepared for class is part of this expectation.

Communication: UI Email

Students are responsible for all official correspondences sent to their UI email address (uiowa.edu) and must use this address for any communication with instructors or staff in the UI community. For the privacy and the protection of student records, UI faculty and staff can only correspond with UI email addresses.

Where to Get Academic Support for This Course

Instructors: Remind students here about your drop-in student hours and also provide information on departmental, collegiate, or university resources helpful for this course, such as the Writing Center <https://writingcenter.uiowa.edu> or the Tutor Iowa central academic support site <https://tutor.uiowa.edu/>.

Mental Health Resources and Student Support

CLAS encourages instructors to draw students' attention to the expanded language on mental health resources in this template at the beginning of the course and frequently throughout the semester.

Students are encouraged to be mindful of their mental health and seek help as a preventive measure or if feeling overwhelmed and/or struggling to meet course expectations. Students

are encouraged to talk to their instructor for assistance with specific class-related concerns. For additional support and counseling, students are encouraged to contact University Counseling Service (UCS). Information about UCS, including resources and how to schedule an appointment, can be found at counseling.uiowa.edu. Find out more about UI mental health services at mentalhealth.uiowa.edu.

Student Care and Assistance provides assistance to University of Iowa students who are experiencing a variety of crisis and emergency situations, including but not limited to medical issues, family emergencies, unexpected challenges, and sourcing basic needs such as food and shelter. More information on the resources related to basic needs can be found at basicneeds.uiowa.edu/resources/. Students are encouraged to contact Student Care & Assistance in the Office of the Dean of Students (Room 135 IMU, dos-assistance@uiowa.edu, or 319-335-1162) for support and assistance with resources.

University Policies

The following links are a series of important university policies that must be included in your syllabus. Please make sure that the links work in the format you provide to your students (i.e., they must work in a PDF copy of the syllabus).

Accommodations for Students with Disabilities

The University is committed to providing an educational experience that is accessible to all. If a student has a diagnosed disability or other disabling condition that may impact the student's ability to complete the course requirements as stated in the syllabus, the student may seek accommodations through [Student Disability Services](#) (SDS). SDS is responsible for making Letters of Accommodation (LOA) available. The student must provide an LOA to the instructor as early in the semester as possible, but requests not made at least two weeks prior to the scheduled activity for which an accommodation is sought may not be accommodated. The LOA will specify what reasonable course accommodations the student is eligible for and those the instructor should provide. Additional information can be found on the [SDS website](#).

