

**MATH 8445: PARTIAL DIFFERENTIAL EQUATIONS I**  
**FALL 2023**  
**COURSE SYLLABUS**

<b>Instructor</b>	Samuel Walsh (walshsa@missouri.edu)
<b>Textbook</b>	<i>Partial Differential Equations</i> LAWRENCE C. EVANS 2nd edition, ISBN: 0821849743
<b>Lecture</b>	MWF 12:00–12:50PM in MSB 111
<b>Office hours</b>	TW 2:00–3:00 PM in MSB 307
<b>Website</b>	Canvas

**Overview.** This is an introductory course on partial differential equations (PDEs). Our preliminary focus will be studying the transport, Laplace, heat, and wave equations. In addition to their use in applications, these serve as representative examples of the three main categories of PDEs (elliptic, parabolic, and hyperbolic). We will study the classical well-posedness theory of these equations, and the qualitative properties of their solutions.

The second part of the class will be devoted to more modern techniques that import machinery from functional analysis, among other sources. This will allow us to consider weak solutions that do not satisfy the equation point-wise, but rather in a distributional or averaged sense. By broadening our definition of solution in this way, we vastly increase the variety of phenomena that can be studied.

Time permitting, we will then look at some special topics such as nonlinear theory or Fourier Analysis methods. Please let me know if you have any particular requests.

**Homework.** Homework be assigned roughly every other week in class. You are strongly encouraged to work together to complete them. You will find that interdisciplinary collaboration is particularly valuable for a course like this. Ultimately, though, each student must submit their own assignment. It is also my definite preference that homework be typeset (using LaTeX, for example) as this is an important part of graduate training. In total, homework will account for 75% of your grade.

**Final.** At the end of the semester, there will be a take-home final exam that must be done individually. It will be due on **Friday, December 15**. The final will account for the remaining 25% of your grade.

**Office hours.** I will hold regular office hours on Tuesdays and Wednesday from 2:00-3:00PM in MSB 307. If you are not available at this time, we can make a special appointment.

**Disabilities.** The goal of the University of Missouri is to ensure an inclusive learning environment for all students. The University of Missouri Disability Center (<https://disabilitycenter.missouri.edu/>) provides services and accommodations for students to participate fully in the learning experience and to experience equitable evaluation of their performance.

Students (including online students) with a documented disability can contact the Disability Center to establish an accommodation plan; see Documented disabilities include hearing, vision, mobility, learning and attention, psychological health, and physical health. Students' accommodations are implemented with the input of students to maximize the learning experiences. The MU Disability Center keeps information about a student's disability confidential.

Please notify me of your eligibility for accommodations as soon as possible. Additionally, if there are aspects of the course that present as barriers, such as inaccessible course content or if you need an immediate accommodation due to an injury, please contact me or contact the Disability Center as soon as possible.

**Academic Honesty.** Academic honesty is fundamental to the activities and principles of a university. All members of the academic community must be confident that each person's work has been responsibly and honorably acquired, developed, and presented. Any effort to gain an advantage not given to all students is dishonest whether or not the effort is successful. The academic community regards academic dishonesty as an extremely serious matter, with serious consequences that range from probation to expulsion. When in doubt about plagiarism, paraphrasing, quoting, or collaboration, consult the course instructor.

Academic Dishonesty includes but is not necessarily limited to the following: Cheating or knowingly assisting another student in committing an act of cheating or other academic dishonesty. Plagiarism which includes but is not necessarily limited to submitting examinations, themes, reports, drawings, laboratory notes, or other material as one's own work when such work has been prepared by another person or copied from another person. Unauthorized possession of examinations or reserve library materials, or laboratory materials or experiments, or any other similar actions. Unauthorized changing of grades or markings on an examination or in an instructor's grade book or such change of any grade report.

**Complaints.** If you have communication (or other problems) with your instructor, you can report them to Professor Calin Chindris (Director of Graduate Studies) either by phone (882-4540) or by e-mail ([muasmathdgs@missouri.edu](mailto:muasmathdgs@missouri.edu)).

For statements on University policy regarding Academic Integrity, Intellectual Pluralism, Mental Health, and COVID-19, see the full syllabus on Canvas.