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: 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, e.g., nonlinear theory. Please let me know if you have any particular requests.

Homework. Homework be assigned 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 his/her own assignment. It is also my definite preference that homework be typeset (using LaTeX, for example). 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. The final will account for the remaining 25% of your grade.

Disabilities. If you need accommodations because of a disability, if you have emergency medical information to share with me, or if you need special arrangements in case the building must be evacuated, please inform me immediately. Please see me privately after
Academic Honesty. Academic honesty is fundamental to the activities and principles of a University. Any effort to gain an advantage not given to all students is dishonest whether or not the effort is successful. When in doubt about plagiarism or collaboration, consult the course instructor. The academic community regards academic dishonesty as an extremely serious matter, with serious consequences that range from probation to expulsion. If at any time you have questions about this policy, please ask.

Complaints. If you have communication (or other problems) with your instructor, you can report them to Professor Dan Edidin (Director of Graduate Studies) either by phone (882-7475) or by e-mail (edidind@missouri.edu).