

MAT476 Partial Differential Equations, Spring 2018

line #:13367

M & W 12:15-1:30; WXLRA111

Text: Partial Differential Equations of Mathematical Physics and Integral Equations, Guenther & Lee

Instructor: Hal L. Smith; URL: <http://math.la.asu.edu/halsmith>

Office: WCLR 631, Phone: 965-3743, messages: 965-3951, e-mail: halsmith@asu.edu

Office Hours: TBD

Pre-requisites: MAT 242, 342, or 343 with C or better; MAT 274, 275, or 475 with C or better; MAT 371 with C or better.

This course will cover linear partial differential equations arising in mathematical physics: the heat equation, Laplace's and Poisson's equation, and the wave equation. It will also cover quasi-linear first order partial differential equations like the transport equation where the method of characteristics will be studied. Classification of linear second order equations, maximum principles, energy methods, separation of variables with special attention to Fourier series and the Fourier transform will play a major role. The notion of a well-posed problem will be emphasized.

Parts of the first six chapters of the text will be covered and, if time permits, parts of chapter eight.

Solution methods for partial differential equations are more complicated than for ordinary differential equations and require considerable time to carry out. Therefore homework problems will play a substantial role in the overall grade. Methods learned in a first course in ordinary differential equations (e.g., MAT275) will be very useful. This being a math course, we will be interested in establishing (i.e. proving) that formal expressions of potential solutions are, in fact, real solutions of the differential equations. This is where content and skills learned in advanced calculus courses (e.g. MAT371) will come in to play.