Instructor: Dacian N. Daescu  
Office: Neuberger Hall 313  
E-mail: daescu@pdx.edu  
Phone: (503) 725-3581  
Office Hours: 12:30 - 13:30 TR. Also by appointment.

Class Time and Location: TR 14:00 - 15:15; SRTC, room 139B

Textbook: No textbook is required. Lectures will cover topics selected from the list of references.

References:

Functional Analysis, Sobolev Spaces and Partial Differential Equations  

Partial Differential Equations  

Partial Differential Equations: Methods and Applications  

Elliptic Partial Differential Equations of Second Order  

Final Examination: Monday, March 14, 10:15–12:05, in class

Course web site: Lecture notes, homework assignments, and other information about the course will be available on the web site: http://www.web.pdx.edu/~daescu/mth622.html  
Students are responsible for checking this site on a regular basis.

Course Description: The course will cover modern theory and applications of partial differential equations. Topics will be selected from:

- Sobolev compact embeddings, weak convergence, reflexive spaces, Poincaré inequality in $H^1(\Omega)$, applications.
- Optimization approach to spectral analysis, max-min characterization of eigenvalues; Ritz-Galerkin approximation to weak solutions.
- Maximum principles for elliptic and parabolic problems (if time allows).

Additional topics may be covered to accommodate students’ interests

Student Learning Objectives: To become familiar with fundamental topics in the modern theory and solution techniques for PDEs; to build the skills and understanding necessary to pursue research in PDEs.
**Prerequisites:** Mth 621.

**Grading Policy:** The final grade will be based on homework and a final project, as follows:

1. **Homework, 75% of the course grade.** Three sets of problems will be assigned as homework.

2. **Project, 25% of the course grade.** Each student is required to complete a project assignment divided into two parts: written report and in-class presentation.

In assigning final course grades, plus/minus grading will be used.

Main criteria for evaluating your work will be: correctness, completeness, and *clarity* of the presentation.

Working in team for your homework and project is encouraged only if each student in the team is contributing to the problem solving.

**Special requests:** If you require special arrangements for seating, testing or other class requirements, please contact me after class or during my office hours.