MATH 352 - PARTIAL DIFFERENTIAL EQUATIONS

Semester: Spring 22
Instructor: Burak Gürel
Office: TB 255, `e-mail: bgurel@boun.edu.tr`

Teaching Assistant: None.

Prerequisites: Solid knowledge of multi-variable calculus.
Ordinary differential equations and linear algebra.

Exams & Grading: Homework/Quiz 20% ($\sim$ 8 sets),
In person midterm 40% ($\sim$ 10th week),
In person final 40%.
Individual "Z-score" of the items above will be observed in letter grading.

Course Schedule: *Online* **Fri 11:00-13:50**
Lectures will be synchronous and recorded.

Textbook: Walter A Strauss, *Partial Differential Equations, An Introduction*,
John Wiley & Sons, Inc., 2008, 2nd edition.

Week	**Topics**	**Section**
1-Feb 25	Introduction. What is a PDE? First-order linear eqns. Flows, vibrations, diffusions.	1.1-1.3
2-Mar 4	Initial and boundary conditions. Well-posed problems. Types of second order eqns.	1.3-1.6
3-Mar 11	The wave eqn. Causality and energy.	2.1-2.2
4-Mar 18	The diffusion (heat) eqn. Diffusion on the whole line.	2.3-2.4
5-Mar 25	Comparison of waves and diffusion. Diffusion on the half-line.	2.5, 3.1
6-Apr 1	Reflections of waves. Diffusion with a source.	3.2-3.3
7-Apr 8	Waves with a source. Diffusion revisited.	3.4-3.5
8-Apr 15	Boundary problems. Separation of variables, the Dirichlet condition. The Neumann condition. The Robin condition.	4.1-4.3
9-Apr 22	Fourier series. The Coefficients. Even, odd, periodic and complex functions.	5.1-5.2
10-Apr 29	Orthogonality and general Fourier series. Completeness.	5.3-5.4
11-May 6	Spring break.	
12-May 13	Harmonic functions. Laplace's eqn. Rectangles and cubes. Poisson's formula.	6.1-6.3
13-May 20	Circles, wedges, and annuli. Green's functions and identities.	6.4, 7.1-7.3
14-May 27	Half-space and sphere.	7.4