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**Fourier Methods and Partial Differential  
Equations**

MATH-338\*

This is a course with topics of special interest in Engineering Physics and Geological Engineering.

**Textbook:** *Boundary Value Problems*, 4th Edition  
by David L. Powers (Academic Press)

**Prerequisites:** MATH 227\* or 272\* or 280\*; MATH 225\* or 226\* or 231\* or 237\*;  
or permission of the instructor.

**Instructor:** S. Kraut

**Evaluation:** Max of A or B

Score A: Homework 30%, Midterm I 15%, Midterm II 15%, Final 40%

Score B: Homework 30%, Max Midterm Mark 15%, Final 55%

**Topics:**

- Review of eigenvectors and eigenmodes in solutions to systems of ordinary differential equations.
- The method of separation of variables in rectangular and cylindrical coordinate systems; sinusoidal and Bessel orthogonal functions.
- The wave, diffusion, and Laplace's (potential) equation.
- Sturm-Liouville theory, eigenvalue problems, eigenfunction expansion, and eigenmodes.
- Fourier transform and, time permitting, Laplace transform techniques.