

**Methods of Applied Mathematics II****MATH 438.3/ MATH 818.3****Course Outline**

**Instructor:** Artur Sowa, Department of Mathematics and Statistics, McLean Hall 225, 966-6114,

[sowa@math.usask.ca](mailto:sowa@math.usask.ca), website: [math.usask.ca/~sowa/](http://math.usask.ca/~sowa/)

**Meeting hours:** 2 times weekly (TR) /-hours TBA/, total of 26 lectures

**Prerequisites:** Math 238 (Introduction to Differential Equations and Series), Math 276 and 277 (Calculus I and II), or equivalent by permission of the instructor. Also, all students who have taken Math 498.3 in T1 are welcome.

**Description:** The course is an introduction to Integral Equations (IE). The goal is to examine concrete examples, and develop the general theory. On occasion, the discussion will extend to include the abstract theory of linear operators. In addition, the course will cover the topic of Distributions and Fourier Transform.

**Topics:**

1. Integral Equations
  - a. Integral Equations with Separable Kernels
  - b. The method of Successive Approximations
  - c. Fredholm Theory
  - d. Applications to ODE and PDE
  - e. Properties of Symmetric Kernels
2. Distributions and Fourier Transforms
  - a. Test Functions and Distributions
  - b. Fourier Transforms, Sobolev lemma
  - c. Applications to Differential Equations
3. Abstract Theory of Compact Operators

**Textbooks:**

- R. P. Kanwal, Linear Integral Equations, second edition (1997), Birkhauser
- W. Rudin, Functional Analysis, second edition (1991), McGraw-Hill

**Grading:** Your grade will be computed as follows:

50% Assignments - A set of mathematical problems will be proposed weekly, or as appropriate. Each student will work on the problems independently. In addition, depending on the audience's interests, there may be longer-term assignments based on a study of suggested literature and/or computer simulation.

50% Final exam -The final exam will consist of a set of problems.

**Additional questions:** Please contact Prof. A. P. Sowa, 966-6114, [sowa@math.usask.ca](mailto:sowa@math.usask.ca)