

Fatih University
Faculty of Arts and Sciences
Department of Mathematics

MATH 609
FRACTIONAL CALCULUS AND ITS APPLICATIONS
SPRING 2012/13

INSTRUCTOR: Prof. Allaberen Ashyralyev

Office: Fatih University, A-322 E-mail: aashyr@fatih.edu.tr

Office Hours: Tuesday: 11:00-12:00

TIMETABLE: Every Tuesday 8:00-11:00 am between February 11,2013-May 17,2013

CONTACT:

ASSESSMENT:

PRE-REQUISITES: None.

Course Objectives: Fractional Derivatives and Integrals, Laplace Transforms of Fractional Integrals and Derivatives, Fractional ODEs, Fractional Integral Equations, Initial Value Problems for Fractional Differential Equations, Green's Functions of Fractional Differential Operators and Applications, Fractional Partial Differential Equations and Applications.

PRINCIPAL TEXTBOOK:

PROGRAMME

WEEKS	SUBJECTS TO BE COVERED
1	Green's Functions of the First Order Differential and Difference Operators
2 & 3	Fractional Derivatives and Integrals. Laplace Transforms of Fractional Integrals and Derivatives
4 & 5	Fractional Derivatives and Fractional Powers of Positive Operators
6	Fractional Difference Derivatives
7	Fractional ODEs and Fractional Integral Equations
8	Mid-term Exam
9	Fractional ODEs and Fractional Integral Equations
10 & 11	Initial Value Problems for Fractional Differential Equations, Green's Functions of Fractional Differential Operators and Applications
12 & 13	Fractional Partial Differential Equations and Applications
14 & 15	Operator Method and Finite Difference Method for Fractional Partial Differential Equations
Will be announced	Final Examination

SUGGESTED READING:

1. Podlubny, Fractional Differential Equations, Academic Press, New York, 1999.
2. Kilbas, A. A.; Srivastava, H. M.; and Trujillo, J. J. Theory and Applications of Fractional Differential Equations. Amsterdam, Netherlands: Elsevier, 2006.
3. Samko, S. G.; Kilbas, A. A.; and Marichev, O. I. Fractional Integrals and Derivatives. Yverdon, Switzerland: Gordon and Breach, 1993.
4. Oldham, K. B. and Spanier, J. The Fractional Calculus: Integrations and Differentiations of Arbitrary Order. New York: Academic Press, 1974.

Grading Policy

Midterm Exam: 50 %, Final Exam: 50 %

Attendance

Classroom and laboratory attendance are mandatory. Students, who are absent over 30% of the class time automatically fail the course.