

King Fahd University of Petroleum and Minerals

**Department of Mathematical Sciences**

**SYLLABUS 142**

Prepared by: Dr. F. D. Zaman

Math 401

Course:	
Title:	Methods of Applied Mathematics II
Textbook:	Applied Mathematics by J. David Logan, 3 <sup>rd</sup> edition (2006).
Objectives:	This course introduces some techniques of applied mathematics such as Green's function, asymptotic and perturbation methods to science and mathematics students
Catalog Description	Introduction to linear spaces and Hilbert spaces. Strong and weak convergence. Orthogonal and orthonormal systems. Integral Equations: Fredholm and Volterra equations. Green's Function: Idea of distributions, properties of Green's function and construction.

Wk	Date	Sec.	Material	Homework
1 2	Jan. 25-29 Feb. 01-05	2.1	Regular perturbation	100-104 pp: Problems:4, 5 (a,b,d, i,j) 8(b), 14
3 4	Feb. 08 - 12 Feb.15-19.	2.2	Singular perturbation	111-112 pp. 1 (a,b), 4
5	Feb. 22-26	2.3	Boundary layer analysis, matching and uniform approximations	121-122 pp. 19b,d) 12 (a, c)
6	Mar.01-05	2.5	The WKB approximation	141 pp. 2
First Major Exam. Monday, March 09, 2015				
7	Mar.08-12	2.6	Asymptotic expansion of integrals	148-149 pp. 4(a)
8	Mar. 15-19	4.1	Eigenfunction expansions	4.1 (d,e) 4.2
Mid Term Break March 22-26				
9	Mar.29-April 02	Class notes	Inner product and Hilbert spaces: basic definitions	To be assigned
10	Apr.05-09	Class notes	Operators in Hilbert space	To be assigned
11	Apr.12-16	4.3	Volterra integral equations	1.2, 1.4
12	April 19-23	4.3	Fredholm integral equations	1.9, 1.11
13	April 26-30	4.4	Green's function	2.2, 2.5, 2.6
Second Major Exam Wed. May 12, 2007				
14	May 03 - 07	xx	Applications of Green's function	To be assigned
15	May10- 14	4.5	Distributions	
KFUPM attendance policy will be enforced. Final Exam shall be comprehensive.				
<b>Office:</b> 5-430, <b>Tel:</b> 860-2189, <b>E-mail:</b> <a href="mailto:fzaman@kfupm.edu.sa">fzaman@kfupm.edu.sa</a>				
Grading Policy: Two Majors each 20%; HW, Attend. 10%, Final 50% .				