

King Fahd University of Petroleum and Minerals

Department of Mathematical Sciences

SYLLABUS 062

Prepared by: Dr. F. D. Zaman

Course:	Math 401
Title:	Methods of Applied Mathematics II
Textbook:	Applied Mathematics by J. David Logan, 3 rd 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. Any one of the following topics: Asymptotic Methods: Laplace method, Steepest descent method, Perturbation Theory: regular and singular perturbations, Integral Transforms: Fourier, Laplace, Mellin and Hankel transforms

Wk	Date	Sec.	Material	Homework
1	Feb. 17-21	2.1	Regular perturbation	2, 5(a,h), 8(b), 16
2	Feb. 24 - 28			1.5 (b), 1.6
3	Mar.03-07.	2.2	Singular perturbation	3, 4
4	Mar. 10-14			
5	Mar.17-21	2.3	Boundary layer analysis, matching and uniform approximations	1(b), 2, 4 12(d)
6	Mar.24-28	2.5	The WKB approximation	1, 3, 4, 7
First Major Exam. Tues. March 27, 2007				
7	Mar.31-Apr.4	2.6	Asymptotic expansion of integrals	2, 4(b), 11, 13
8	Apr. 07-11	Class notes	Inner product and Hilbert spaces: basic definitions	To be assigned
Mid Term Break April 12 - 15				
9	Apr. 16-18	Class notes	Operators in Hilbert space	To be assigned
10	Apr. 21-25	4.1	Orthogonal expansions	2, 4, 5
		4.2	Sturm Liouville problem	2, 5
11	Apr.28-May 2	4.3	Volterra integral equations	1, 4(a), 5, 7(a), 10
12	May 5-9	4.3	Fredholm integral equations	18, 21
13	May 12-16	4.4	Green's function	2, 4, 7
Second Major Exam Wed. May 12, 2007				
14	May 19 - 23	4.4	Applications of Green's function	To be assigned
15	May 26- 30 June 3	4.5	Distributions	2, 5(b), 8
KFUPM attendance policy will be enforced. Final Exam shall be comprehensive.				
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Grading Policy: Two Majors each 20%; HW, Attend. 20%, Final 40% .				