King Fahd University of Petroleum and Minerals

Department of Mathematics & Statistics

MATH 514 Advanced Mathematical Methods

Semester I, 2014-2015 (141)

Dr. F. D. Zaman

Text Book: James P. Keener, Principles of Applied Mathematics (Addison Wesley Publishing Company)
Additional Reading: Brian Davis: Integral transforms and their applications, Springer,2002.
Objectives: This course is designed to introduce advanced mathematical methods to graduate students in Mathematics, Science and Engineering.
Bulletin Description: Integral transforms; Fourier, Laplace, Hankel and Mellin transforms and their applications. Singular integral equations. Wiener Hopf technique. Applications of conformal mapping. Introduction to asymptotic expansions.

Week	***Date***	**Chapter**	**Topic**
1 - 2	Aug.31– Sept.11	6.1, 6.2	Review of Complex integration. Branch points and integration along branch cuts.
3-4	Sept.14–25	7.2	Fourier and Laplace transforms, analyticity of transforms and inversion.
Tuesday, September 23, 2014 National Day September 26 – October 11 Eid Al-Adha Break			
5-6	Oct.12– Oct.23	Additional material	Applications of Fourier and Laplace transforms.
7	Oct.26-30	7.3	Hankel transform; properties and applications
8	Nov. 2 – 6	Additional material	Mellin transform; properties and applications
9	Nov. 09-13	3.1, class notes	Singular integral equations
10	Nov.16 – 20	Additional material	Wiener-Hopf method for singular integral equations
11	Nov.23 -27	Additional material-	Wiener-Hopf method for mixed boundary value problems
12	Nov. 30 – Dec.04	6.3	Conformal mappings; applications.
13	Dec. 7 – 11	10.1	Little o and big O symbols; asymptotic functions
14	Dec.14–18	10.2, 10.3	Asymptotic sequences and series. Asymptotic approximation of integrals.
15*	Dec. 21 – 25		Catching up and Review
December 28 is Normal Tuesday class and is Last day of classes			

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Evaluation Scheme

Midterm Exam	40 %
Assignments/Attendance	15 %
Final	45 %