DEPARTMENT OF MATHEMATICS,

UNIVERSITY OF KARACHI,

Course Outline

MATH 510: METHODS OF MATHEMATICAL PHYSICS - II

Course contents:

Partial differential equations of Mathematical Physics. Method of separation of variable. Boundary value problems relating vibration of strings and membranes, heat conductionand potential theory. Qualitative theory of differential equations. First order equation and models of population growth. Qualitative analysis of second order autonomous systems. Almost linear systems. Examples of damped pendulum and Lotka-Volterra equations. Liapunov's second method. Lorenz equations: chaos and strange attractors.

Books Recommended:

1. Boyce, W. E. and De Prima, R. C., Elementary Differential Equations and Boundary Value Problems; Fifth Edition, Wiley, New 1992
2. Churchil, R.V. and Brown, J. W., Fourier Series and Boundary Value Problems, Third Edition, Mc Graw Hill Kogakusha, Tokyo1978
3. Finnery, R. L. and Ostberg, D. R., Elementary Differential Equations with Linear Algebra Addison Wesley, Reading, Mass. 1976.
4. Rainville, E. D. and Bedient, P. E., Elementary Differential Equations, Seventh Edition, Macmillan, New York1989
5. Leighton, W., First Course in Ordinary Differential Equations, Wadsworth Publishing Co. Belmont, California, 1981.
6. Arrowsmith, D. K. and Place, C. M., Ordinary Differential Equations, Chapman and Hall, 1982.
7. Barelli, R. L. and Coleman, C. S., Differential Equations, John Wiley and Sons, New York, 1998.
8. Humi, M. and Miller, W. B., Boundary Value Problem and Partial Differential Equations. PWS-Kent Publishing Co., Boston, 1992.
9. Raisinghania, Ordinary and Partial Differential Equations. Chand S. and Co Ltd, India, 2007.
10. Kevorkian, J., Partial Differential Equations, 2nd edition, Springer, 1999.
11. Zwillinger D., Handbook of Differential Equations, AK Peters, 1992.
12. Birkhoff, G. and Rota, G. C., Ordinary Differential Equations, Forth Edition, John Wiley and Sons, New York, 1989.

13. Jain, R. K. and Iyengar, S.R.K., Advanced Engineering Mathematics, Third Edition, Narosa Publishing House, New Delhi, 2007.
14. O'Neil, P. V., Advanced Engineering Mathematics, Fifth Edition, Cengage Learning, 2003.
15. Dennis, G Zill, Micheal R Cullen, Differential Equation with Boundary Value Problems, Fifth Edition, Loyala Marymond Uni., Brooks Cole Pub., 2001.
16. Kreyszig, E., Advanced Engineering Mathematics, Ninth Edition, John Willey, 2005.
17. Pandey R. K., Partial Differential Equation in several complex variable, Anmol Publication Pvt. Ltd., 2008.
18. Pandey R. K., Partial Differential Equation in complex variable and integral transforms, Anmol Publication Pvt. Ltd., 2008.
19. O'Neil P. V., Beginning Partial Differential Equations, Second Edition, Wiley Interscience Pub., John Wiley and Sons Inc., 2008.