Math 136: Methods in applied mathematics

ORC syllabus

This course introduces a wide variety of mathematical tools and methods used to analyze phenomena in the physical, life, and social sciences. This is an introductory course and is accessible to undergraduate and graduate students in mathematics and other scientific disciplines who have completed the prerequisites. Topics include dimensional analysis and scaling, perturbation analysis, calculus of variations, integral equations, and eigenvalue problems.

References.

[L] J. David Logan, *Applied mathematics*, John Wiley & Sons, 3rd ed., 2006.

Methods in applied mathematics.

1. Dimensional analysis and scaling.
2. Differential equations: Uniqueness, existence, and numerical approximations.
3. Perturbation methods, asymptotic analysis.
4. Some basics in functional analysis.
5. Calculus of Variations.
6. Orthogonal expansions, generalized Fourier series, Sturm-Liouville problems.
7. Integral equations.
8. Green's functions.
9. Distributions and generalized functions.