

MATH 538 R1: Techniques of Applied Mathematics

11:00-12:20 TR, Location CAB657

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Office Hours: preferably by appointment (or drop in, if lucky)

Text: The following textbooks are recommended but not required:

- Applied Mathematics,
2nd Ed., J. David Logan, Wiley and Sons Pub.
- Advanced Mathematical Methods for Scientists and Engineers,
Bender and Orszag, Springer-Verlag Pub.
- Perturbation Theory,
Lister, Cambridge University Press

Marking Scheme:

40% Homework Assignments; 30% Midterm Exam; 30% Final Exam
(Alternately, Final Exam is 60% if this is better than 30%-Midterm + 30%-Exam.)

Homework Assignments:

- 4 assignments total, each given equal weight. Assignments are due on the date and time indicated on the question sheet.
- Assignments may be downloaded from the web (see below).

Important Dates:

Midterm Exam: 11:00-12:20 in class on Thurs. Feb 16.
(There is no deferred midterm.)

Final Exam: 9:00-noon on Wed. Apr. 19 (location TBA)

Syllabus:

- Dimensional analysis and Buckingham PI theorem
- Scaling theory, transformation of differential equations to dimensionless form
- perturbation theory for roots of polynomial and matrix eigenvalue problems
- perturbation theory for ordinary differential equations, boundary layer theory
- WKB theory
- asymptotic expansions of integrals
- (time permitting: acceleration of series convergence, Pade approximants)

Further information:

See web at <http://www.math.ualberta.ca/~bruce/courses/math538.html> for assignments, overheads, and other course-related material.