

## SE 289 (JAN) 3:1 Numerical Solutions of Differential Equations

### General information

**Instructors:**

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**Timings:** 9:55AM-10:55AM on Monday, Wednesday, and Friday.**Place:** Room No: 202 (SERC).**Main Reference text books<sup>1</sup>:**

1. *Mathematical Methods for Physicists*, G. B. Arfken and H. J. Weber – Fourth Edition, Prism Books, 1995.
2. *Numerical Recipes in C/FORTRAN*, W. H. Press, S. A. Teukolsky, W. T. Vetterling, and B. P. Flannery – Cambridge University Press, 1992 (e-book: <http://www.nr.com/oldverswitcher.html>).
3. *Numerical Partial Differential Equations for Environmental Scientists and Engineers – A First Practical Course*, Daniel R. Lynch – Springer, 2005.  
(e-book: <http://www.springerlink.com/content/w2v068/>).

**Course Web Page:** <http://www.serc.iisc.ernet.in/~phani/2009SE289/SE289.html>**Grading:** Homework/Lab: 50%; Final Exam: 50%.

**Course Philosophy:** There are two important aspects for any course in numerical methods. The first being understanding the theory behind the techniques/methods taught in the class, and second is knowing the analysis to evaluate these techniques for its strengths and limitations. You will be evaluated on both aspects. The homework problem sets are primarily geared towards making you learn the second aspect, whereas the final exam will be geared towards testing you on the first aspect.

**Homework/Lab:** There will be 7 homework problem sets with a specific due date and time. Each student will post the solutions on the internet by the due date and time, meet the instructor to discuss the solutions for the homework problems in the afternoon of due date. Solutions will be posted on the course web page after the due date. All homework problems require computer programming.

**Computer Languages:** Fortran or C/C++ can be used as the primary computational language for this course. LAPACK is supported by all these languages. *Usage of Matlab and/or Mathematica for solving homework problems is prohibited.* Matlab and/or Mathematica can be used for graphics.

**Honor Principle:** *You are welcome to exchange ideas in solving homework problems with your colleagues, but all the work submitted for grading (homework and final exam) must be your own work (i.e., you must have worked out all details by yourself). Copying computer code or files without the citation is considered as plagiarism.*

<sup>1</sup>Supplementary texts will be used depending on the topic.