

MATH 686/001 (Spring 2008)
Numerical Solution for Differential Equations

Instructor: Padmanabhan Seshaiyer

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Class Time : T 7:20pm – 10:00pm Venue : Science and Tech I (Room 242)
Office hours : T 6:00pm – 7:00pm, Tr 3:00pm – 4:00 pm and by appointment
website : <http://math.gmu.edu/~pseshaiy/S08/m686/686S08.html>

About the course: Mathematical models describing physical situations are frequently expressed as differential equations. This course will be devoted to the development and analysis of methods for the numerical solution of differential equations. Both the numerical methods and applications will be considered with emphasis on partial differential equations. The course will focus on finite difference methods and finite element methods for elliptic problems but parabolic and hyperbolic problems will also be considered. Graphics, meshing, and simple iterative techniques will also be discussed and implemented as computer codes. The primary reference will be Lecture notes provided by the instructor that will be posted on the course website on a regular basis.

Expected Learning Outcomes: In this course, the emphasis will be to apply well-know numerical techniques for solving differential equations arising in engineering problems and evaluate the results. The objective will be to train students to develop, analyze and implement the methods. In particular, the students will become proficient in: (a) Understanding the theoretical and practical aspects of the use of numerical methods for differential equations; (b) Implementing numerical methods for a variety of multidisciplinary applications and; (c) Establishing the limitations, advantages, and disadvantages of the numerical methods used in practice. The expected learning outcomes for the course will be assessed through: Exams, homeworks, in-class activities and class discussions. Problem-based learning will be an integral part of the course.

Assessments and Grading: There will be six homework assignments during the semester each worth 10% assigned every other week, that will include both theoretical and computational problems. The solutions must be neatly written up and handed in on time to receive full credit as they add towards 60% of the total grade. Students must also prepare for inclass presentations based on their homework which will be worth 10%. There will be one midterm exam worth 10% that will be based on the various mathematical techniques presented in the class during the semester. There will be one final exam worth 20% and will be held on **Tuesday May 13, 2008 from 7:30 pm - 10:15 pm.**

Academic Integrity: All students will be expected to abide by the Honor Code: *Student members of the George Mason University community pledge not to cheat, plagiarize, steal, or lie in matters related to academic work.*

Disability Accomodation: Any student who, because of a disability, may require some special arrangements in order to meet course requirements should contact the instructor as soon as possible to make such accomodations as may be necessary.

Good Luck and please feel free to contact me if you have any questions.