

**Foundations of Applied Mathematics (FOAM)
MATH-4700
Fall 2018**

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Approximate Schedule

Weeks 1, 2 Dimensional Analysis, Scaling
Weeks 3, 4 Regular Perturbations
Weeks 5, 6 Singular Perturbations
Exam 1
Weeks 7, 8 Chemical Kinetics
Weeks 9,10 Diffusion, Random Walks and Brownian Motion
Exam 2
Weeks 11,12 Traffic Flow and Waves
Weeks 13,14 Continuum Mechanics
Exam 3

Course Web-site

<http://eaton.math.rpi.edu/faculty/Holmes/Courses/FOAM/Fall18/index.html>

Textbook

Introduction to the Foundations of Applied Mathematics by M. H. Holmes

Grading

Homework: 40%, Exams 60% (no final exam)

Comments: 1) No homework score will be dropped. 2) Grade modifiers are not used.

Difficulty Level and Pre-requisites

This course requires mathematical maturity and familiarity with the basic concepts from calculus (particularly Taylor's theorem), and differential equations (MATH-2400). Very little time, if any, will be spent reviewing these background skills and concepts.

Course Objectives

We will cover the first six chapters of the textbook. In addition to getting a solid grounding on the core material in these sections, it is anticipated that students will gain the following: an ability to model physical systems, improved skills at deriving analytical solutions of the mathematical models, and an ability to determine the qualitative behavior for the solutions of nonlinear problems.

Attendance and Course Material

The material covered is mostly in the textbook. However, many of the topics are challenging, and often involve subtle ideas that are best understood by discussing them. So, although class attendance is not required (except for turning in homework and taking the exams), class attendance is very strongly recommended. Moreover, you will be responsible for any information given out in class.

Academic Integrity

Do not copy or cheat during exams. As for homework, you can discuss the problems with others in the class, but what you turn in must be your own work. In no case, may you copy from someone else's homework. Violating this policy will result in a score of zero for the assignment. Also, all the rules and policies in the Rensselaer handbook should be followed.

Grade Appeals

Appeals must be made within one week of the date the item is returned in class. It is important that you keep all the returned material for the entire semester as they will be your only method for correcting any recording errors that may accidentally occur on my part.

Late Policies

Late homework is usually not accepted without a legitimate excuse. Missing an exam without a legitimate excuse results in a grade of zero and cannot be made up. If you have an excuse, you should contact me as soon as possible and I may ask for verification.