Welcome to Physics 605/480: Math Methods I

Instructor: Mark Henriksen
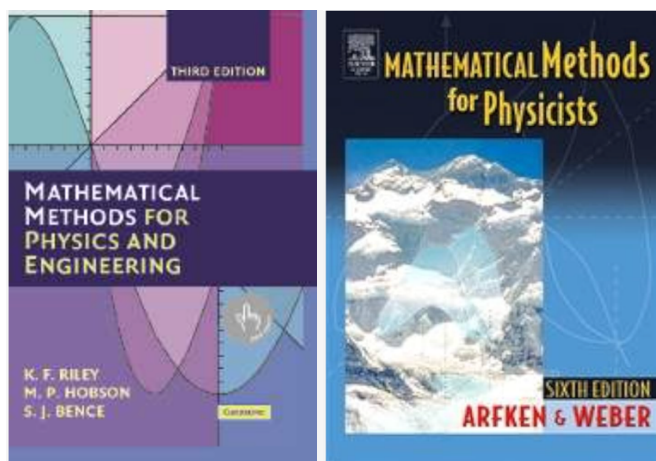
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Scope and Goals

Course content comprises three topics: linear algebra, complex analysis, and statistics. Sub-topics are given in the schedule. Our goal is that the content is useful in your physics courses and research and also that it is enjoyable and interesting to learn.

The primary textbook is Mathematical Methods for Physics and Engineering by Riley, Hobson, and Bence. Mathematical Methods for Physicists by Arfken and Weber is a secondary reference. Arfken's book is especially good for complex analysis. The chapters covered in each book are given in the schedule.

Homework

Homework assignments will be posted on blackboard. Homework assignments are due at the beginning of class on the date given in the schedule. Generally, the due date is a Monday, though there are exceptions because the semester starts mid-week and there are two holidays in the semester. Non-Monday due dates are highlighted in the schedule.

Grading

There will be three midterms, worth 20% each, covering each topic. The weekly homework assignments are worth a total of 20% or 1.66% each. The final exam is worth 20%. Exam

dates are given on the schedule and highlighted in red. You can check on grades at any time using the course site on blackboard.

Weeks	Topics Covered	Chapters	Homework Due Date *(mostly Mondays)*
1-4	vector spaces, matrices and operations, SVD, linear equations	RHB: 7,8	1. 9-6 (F) 2. 9-13 (F) 3. 9-16 4. 9-23
5	Midterm		9-27 (Friday)
6-9	complex numbers, arithmetic, infinite series, singularities contour integration, calculus of residues	RHB: 3,24 Arfken: 6,7	5. 10-7 6. 10-14 7. 10-21 8. 10-28
10	Midterm		10-30 (Wednesday)
11-14	probability and permutations common PDFs: binomial, Gaussian, Poisson, and gamma. estimation theory, maximum liklihood, linear regression, Spearman rank correlation, Bayesian analysis Markov chain Monte-Carlo *Optional: c*lustering, graph Theory	RHB: 30,31 Arfken: 19	9. 11-11 10. 11-18 11. 11-25 12. 12-4 (W)
15	Midterm		12-6 (Friday)
	Final exam	Friday, 12-13	1:00 – 3:00pm