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Course Information



General Information

Mathematical Methods of Physics, Fall 2018

Lectures:

Tuesday and Thursday, 11:00-12:15, and Friday 11:00-11:50, P&A 184

Instructor:

Professor Akimasa Miyake

office: P&A 25, email: amiyake_at_unm.edu, office hours: Thursday 13:30-15:30, otherwise you may arrange a meeting by appointment.

Teaching Assistant:

Austin Daniel

office: P&A 30, email: austindaniel_at_unm.edu, office hours:

Textbook:

Mary L. Boas, "Mathematical Methods in the Physical Science," 3rd Edition, Wiley (required)



Course Overview

The purpose of this course is to introduce students to two important areas of mathematical physics, linear algebra and partial differential

equations (PDEs), because of their ubiquitous applications to physical problems in mechanics, electromagnetism, and quantum mechanics at the upper-division undergraduate level. This class will provide a physics-based coverage of these mathematical areas in contrast to the more traditional linear algebra and PDE classes offered by the Mathematics department. The course prerequisites are officially PHYC 290 and MATH 316 (otherwise, students may discuss their enrollment with the instructor). The course is suitable for undergraduate students (mainly the physics and astrophysics majors) to prepare their mathematical background needed to tackle junior and senior level physics classes, based on the foundational concepts of complex numbers, vector analysis, and ordinary differential equations.

We adapt modern pedagogy of active learning in classroom. It is quite important to do exercise, in order to digest notions and methods learned in the lectures. Furthermore, the problems of homework assignments will be selected largely from the exercises of the textbook in accordance with the progress of lectures. The final grade will be determined based on performance of exams and assignments (their weights are 70 % and 30 % respectively, for now). Each mid-term exam is arranged after a couple of chapters are completed. That is how you can study rather narrow, clearly-defined selections of materials for every exam, while they are still fresh in your mind. Overall it is expected that your learning is more effective and at the same time the load by the course is less stressful this way.



Syllabus

The textbook provides materials enough for a year-long course, so it is expected that we can only cover the following topics.

2. Complex numbers
3. Linear algebra
6. Vector analysis
7. Fourier series and transforms
13. Partial differential equations



Lecture Notes



Homework

Students may study subjects of assignments together, but everyone is expected to prepare his/her original answer sheets.