

Physics 274 F19 Info and Syllabus

Prerequisites: MATH241 and PHYS272.

Instructor: Prof. Raman Sundrum, PSC 3116, 301-405-6012, raman@umd.edu

Office Hours: Wed@3-4pm.

TA: Kaustubh Deshpande, ksd@umd.edu

Class times: MWF 12:00pm-12:50pm in PHY Toll Bldg. Rm.1201

Class web page: via ELMS <https://elms.umd.edu>

Textbooks: Mathematical Methods in the Physical Sciences, 3d Ed, by Mary L. Boas (required).

A Guided Tour of Math Methods for the Phys Sciences, by R. Sneider (optional extra reading)

Homework: There will be regular weekly homework, consisting of Problem Sets with problems taken primarily from Boas. The Problem Sets will be posted on ELMS each week. Solutions will be posted after the due dates. Homework scores will count towards the final grade (see below). Each Problem Set will be given a percentage grade. Only a subset of the questions will actually be graded and count in this percentage, but the subset will be undisclosed at time of posting the homework, so you should complete the entire problem set each week. Your lowest two weekly grades will NOT be counted. You can discuss with others in doing the homework, but your submitted work should represent your own understanding. Homework should be turned in on the due date, in class. If you cannot turn it in on the due date, send me and the TA an email to inform us, and then turn in the homework directly to the TA within 24 hours of due date.

Exams: There will be 2 Midterms and a Final, all in-class exams. Tentative Midterm dates are Oct. 4 for M1 and Nov. 15 for M2. No calculators or other electronic devices to be deployed. All exams are closed book, and no notes are allowed in the exam. But important relevant formulas will be provided.

Grading: The class final grade will be based on Homework, 2 Midterms, and the Final. They will be weighted according to HW =20%, M1 =25%, M2 = 25%, Final = 30%. The percentage grade will be converted to +/- letter grades at the end of semester, with cutoffs for different letter grades based on my best judgement.

Attendance: Attendance in lectures is mandatory. By and large, I will follow the textbook. However, explanations, emphasis and some detailed material will vary from topic to topic. Therefore, if you miss a class, review appropriate material in the text, but also consult a class-mate's notes for what you missed in lectures.

Course content:

Complex Variables: Infinite series, elementary complex functions

Multivariate Calculus, Curvilinear Coordinates and Vector Analysis: differentials, maxima/minima, change of variables, integration; cylindrical, spherical coordinate and other curvilinear coordinate systems; (vector) fields, gradients, divergences and curls and their geometrical interpretation, with examples from physical systems; Gauss' and Stokes' theorems; line and surface integrals.

Linear Algebra: Linear vector spaces; linear operators and their representation as matrices; matrix algebra; determinants and their application to the solution of linear inhomogeneous equations; inner products; eigenvalues and eigenfunctions with examples of applications to physical problems; infinite dimensional vector spaces.

Dirac Delta Functions: Properties of the delta function; delta function of a function; delta functions in more than one dimension.

Phys274 dovetails into and is a pre-req for Phys373. Material from 274 will be assumed in 373.

Academic Integrity: The university has approved a code of academic integrity available on the web. The code prohibits students from cheating on exams, plagiarizing papers, submitting the same paper for credit in two courses without authorization, buying papers, submitting fraudulent documents, or forging signatures. The university senate requires that students include the following signed statement on each examination or assignment: I pledge on my honor that I have not given or received any unauthorized assistance on this examination. Compliance with the code is administered by a student honor council, which strives to promote a community of trust on the College Park campus. Allegations of academic dishonesty may be reported directly to the honor council (301-314-9154) by any member of the campus community

For further course related policies and information, consult
<http://www.ugst.umd.edu/courserelatedpolicies.html>