Physics 274 F20 Info and Syllabus

Prerequisites: MATH241 and PHYS272.

Instructor: Prof. Raman Sundrum, PSC 3116, raman@umd.edu
Office Hours: Tentatively Wed@2-3pm.

TA: Arushi Bodas, arushib@umd.edu

Class times: MWF 12:00pm-12:50pm in PHY Toll Bldg. Rm.1412

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)

Class Format: My intention is to give in-person lectures at the above location, supplemented by video streaming and recording of the lectures for students who are unable to attend, and for all students to review afterwards. Office hours will be held in-person in a sufficiently large room to be determined, supplemented by a zoom office hour

If the University or I perceive the Covid-19 risk to be too high, I will switch the lectures and/or office hours over to interactive online zoom format.

By and large, I will follow the textbook presentation. However, explanations, emphasis and some detailed material will vary from topic to topic, so it is very important to attend/view the lectures.

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. 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, unless you have emailed myself and the TA to explain the reason and been granted an extension.

Exams: There will be one Midterm and a Final. The tentative Midterm date will be Oct. 14. No calculators or other electronic devices to be deployed. At this point, I plan to have

in-person exams. As we move closer to exam dates, be in touch if you have reason to not do in-person exams.

Grading: The class final grade will be based on Homework, the Midterm and the Final. They will be weighted according to HW =30%, Midterm =30%, Final = 40%. 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.

Course content:

Complex Variables: Infinite series, elementary complex functions

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.

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.

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.

Needless to say, stay tuned for updates in the above as the semester proceeds.

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