ELECTRICITY AND MAGNETISM (PHYS 231)

Lecture 1: Introduction

Aug 19, 2024

Office Hour & Tutorial Center

If you have physics-related questions, writing emails to me is very inefficient...

Preferred Approaches

1) Office Hour

Location: Nielsen 217A
Time: 09:30 – 10:30 am every Monday

2) Tutorial Center

Location: 512 Nielsen Building
Time: See https://physics.utk.edu/undergraduate/ for details.
(Almost ANYTIME between 11:15 am to 4:25 pm, Monday to Friday)

Grade

Weighted Averages of the homework assignments, in-class participation (clickers), the laboratory, two 50-mins exams, and the final exam

Homework	**30%**
In-class Quiz/Discussion participation	**15%**
Laboratory	**25%**
Two 50-mins In-Class Exams	**20%**
Final Examination (2-Hour test)	**15%**

A	90 - 105
A-	85 - 89
B+	80 - 84
B	75 - 79
B-	70 - 74
C+	65 - 69
C	60 - 64
C-	55 - 59
D+	50 - 54
D	45 - 49
D-	40 - 44
F	0 - 39

Homework

Assigned On-Line using MasteringPhysics. Register with your netID.

- Approximately one assignment/week

(*exercises of the current course + tutorials of the next course*).

Practice for contents

Prepare for the new CH

About Reading Assignment (~25 pages for one chapter)

(1 page summary for one chapter)

It is **absolutely common** to have questions when completing your reading assignments.

Mark the questions you have & hold them to the lecture.

This is how you find out ***which part you should pay more attention*** to during the lecture.

If your puzzle is **NOT** resolved during the lecture, talk to me after the lecture or visit my office hour.

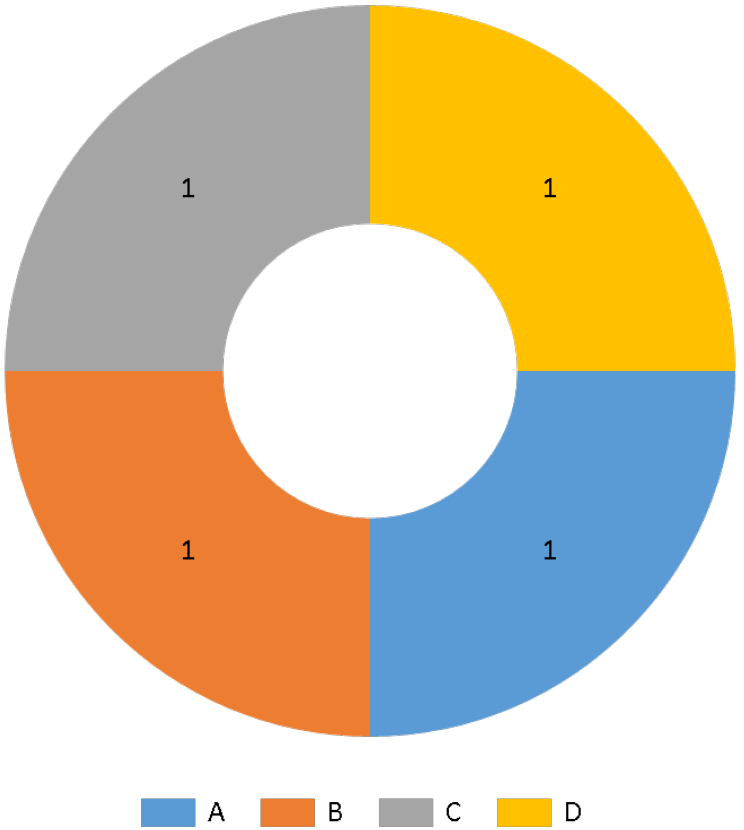
Who is the instructor for this course

A. Yang Zhang.

B. Jacob Gayles.

C. Kurt Godel.

D. Hiroaki Ishizuka.



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Paid research opportunity: LLM for physics

Prompt Engineering for LLM Extraction of Material Parameters

Introduction: We are interested in harvesting physics knowledge from the literature using Large Language Models (LLMs) and Retrieval Augmented Generation (RAG) in order to build large, high-quality materials databases. Our ultimate goal is to create interactive agents capable of surveying the physics literature and summarizing current and past research. Large language models work by forming probability distributions over subsequent tokens and sampling over the output distribution. This means that constraining their output to set schema useful for constructing databases is a difficult task. Simply discarding responses that do not conform to a given schema significantly reduces accuracy even when the output is ostensibly correct.

Goal: Survey and test the prompt engineering literature to find the latest techniques in this rapidly growing field. It is already well known that providing examples improves response quality, but we would need to construct example responses for unknown material parameters that we have not considered. One idea is chain-of-thought prompting, in which LLMs are asked to explain their work in several steps, improving logical reasoning. Other than improving reasoning, programming languages have emerged to constrain LLM output and prompt the LLM using procedural logic. We could possibly use this to ask the LLM to classify the material and extract the parameters for a given paper, which would greatly simplify our workflow. Finally, we are interested in determining which papers in the vast condensed matter literature are experimental works by using an LLM on the abstracts, which are freely available through publisher APIs.

Play with multiple A6000 and H100 GPUs.
Contact yangzhang@utk.edu if interested!