Physics for Everyone!
(Course Outline)

Instructor
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ELLA Semester
Winter 2023

Dates/Times
January 16 - January 27 (5-6pm)

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Course Description

Physics seeks to understand fundamental relationships and patterns in our world and universe to answer big questions such as, “How did the universe begin? Where did it come from? What is it made of? How does it *work*? Why is it this way?”. These questions have driven us for near eternity to explore our physical environment and the events that take place within it, ultimately in search of understanding ourselves and our existence. Along the way, these important questions, combined with our attempts to answer them (and relevant results) have iteratively enabled us to better our ability to answer big questions in the first place. But though we now know much about the universe there is much that we know that we do not know. It is on this frontier of the unknown that physics is practised.

In this course, you will learn about physics, from physics and with physics. Learning about physics entails understanding what it is, what it is not, where it came from and how it was (and is) developed. The latter is especially important, and is addressed most heavily in the first few lectures by developing historical empathy for early humans and their quest to understand the sky. Learning from physics entails connecting objects, processes and events from your life to fundamental patterns or principles in physics. This will also reveal the existence of simpler, general patterns that explain a wide variety of processes that may otherwise seem quite unrelated. Finally, learning with physics will enable you to use your understandings from the course to independently ask and answer questions like a physicist. Solving your own hunches, suspicions, problems or curiosities is both satisfying and powerful.

One primary objective of this course is to be fascinated and inspired enough by the universe’s workings to continue engaging in physics learning after the course. Another is to develop a solid, networked base of conceptual tools to do just that. One does not have to be a physicist to practise and enjoy physics - after all, this *is* Physics for Everyone!

Your instructor,

Reuben S. Gazer

Class Schedule (Dates & Lecture Topics)

Week 1	
To do (optional): ☐ Getting to Know You Survey	
Monday January 16	The Big Questions
Tuesday January 17	Looking at the Sky and Asking Why
Wednesday January 18	The Copernican Revolution: A Paradigm Shift
Thursday January 19	The Real Copernican Revolution: Newtonian Gravity
Friday January 20	Classical Mechanics: Predicting the Future
Week 2	
Monday January 23	Particles
Tuesday January 24	Electricity and Magnetism
Wednesday January 25	Electromagnetism & Light
Thursday January 26	Quantum Mechanics
Friday January 27	Stars, the Universe and You

Extra Physics Resources

The following is a short list of books and Youtube channels that I feel are accessible, high quality and useful. Though I know many resources, I've included only my absolute favourites. Enjoy!

Books

- *Six Easy Pieces* by Richard Feynman
- *The Disappearing Spoon* by Sam Kean
- *The Copernican Revolution* by Thomas Kuhn
- *The Theoretical Minimum* by Leonard Susskind
- *A History of the Universe in 21 Stars* by Giles Sparrow

Youtube channels

- Steve Mould
- Veritasium
- MinutePhysics
- Sabine Hossenfelder
- The Institute of Art and Ideas (IAI)