University of Southern Maine **Dept. of Physics**

Physics 211 Syllabus

Modern Physics I
Science C277 Tu/Th: 11:00-12:15

Instructor

Paul Nakroshis pauln@maine.edu
Office: 224 Science **Lab:** 252 Science 780-4158
Department of Physics **Office Hours:** M - Th 13:30 - 3:30
Portland Campus or by arrangement

Course Description: This course is a discussion of the more important topics which show the departure of physics from its classical roots, namely, relativity, the strange behaviors of light and of matter on a small scale, atomic structure, and Quantum Mechanics.

Textbook:

Modern Physics for Scientists and Engineers, 2nd edition, by John R. Taylor, Chris D. Zafiratos, and Michael A. Dubson.

Recommended Reading:

Special Relativity, by T. M. Helliwell

The Feynman Lectures in Physics, by Richard Feynman.

When I was an undergraduate summer student at the Fermi National Accelerator Laboratory, the Head of the Theory section, Drasko Jovanovic, said "...if you want to be a real physicist, read and understand *cold* all three volumes of the Feynman Lectures." (I guess I am not a real physicist yet!) An excellent and inspiring series of lectures.

Atendance Policy:

I expect that everyone will be at every class except in extenuating circumstances. If I find that you are missing class too often (i.e. more than three times), you can expect that I will talk with you and that you will likely receive a lower grade for the course. If you miss a class in which a test is given, you will not be given a makeup except in exceptional cases, or if you have prearranged due to a conflict.

Outside Help/Office Hours

In general, if my office door is open, I am happy to help you, so feel free to stop in and ask questions. If I am not in my office, I may be in my lab in room 252. I have set aside several hours where I will make a point to be in my office. Please take advantage of my willingness to help you!

Assessment

I am unfortunately obligated to assign a letter grade for each person enrolled in this course. This grade is my *subjective* sense of your level of understanding of the physics we discuss in this class. In addition, I will base this on your performance on 2 exams, Weekly problem sets, and a comprehensive final exam as follows:

Exam # 1	Thursday, October 10, 2024	200 pts
Exam # 2	Thursday, November 12, 2024	200 pts
Problem Sets	Roughly 1 per week	400 pts
Final	11:00 - 13:00 Thursday 19 Dec 2024	200 pts

Important Note on problem sets:
Problems sets should be written as if the audience is a student at another university looking for help in understanding the solution to the problem. As such, you should lead the reader through the solution by appealing to relevant physical principles and you should write in grammatically correct english. The well written problem set will read like an excellent solution manual, with textual descriptions interspersed with important mathematical equations (as well as pictorial and graphical descriptions when needed) placed on a separate line, centered on the page.

**** Late problem sets will lose 25% per day late.**

Topical Syllabus

The list below includes the topics we will discuss. The amount of time spent on each chapter is my best guess, and we will make any necessary in–course corrections.

Taylor: Ch 1 The Space and Time of Relativity	1.5 weeks
Taylor: Ch 2 Relativistic Mechanics	1.5 weeks
Taylor: Ch 3 Atoms	2 weeks
Taylor: Ch 4 Quantization of Light	1 weeks
Taylor: Ch 5 Quantization of Atomic Energy Levels	1 weeks
Taylor: Ch 6 Matter Waves	1.5 weeks
Taylor: Ch 7 The Schrödinger Equation in One Dimension	2 weeks
Taylor: Ch 8 The Three Dimensional Schrödinger Equation	2 weeks

This schedule may change depending on the needs of the class...