

# Physics 216: Topics in Contemporary Physics

## Professor: Lyle Hoffman

### Fall 2016

In the following table, M refers to Martin, *Nuclear and Particle Physics* and TR refers to Thornton & Rex, *Modern Physics*.

<b>Month</b>	<b>Date</b>	<b>Topic</b>	<b>Reading</b>	<b>Work Due</b>
Aug.	29-2	Introduction	M1	Problem Set 1
Sept.	5-9	Nuclear Masses	TR12.1-5 M2.1-3	Problem Set 2
	12-16	Nuclear Decays & Reactions	TR12.6-8 M2.4-9	Problem Set 3
	19-23	Leptons	TR14.1-4,14.7 M3.1	Problem Set 4
	26-30	Quarks & Hadrons	TR14.5-6 M3.2-3	Problem Set 5
Oct.	3-7	Accelerators	TR14.8 M4.1-3	Problem Set 6
	12-14	Detectors	M4.4-5	Problem Set 7
	17-21	Quark Dynamics	M5	Problem Set 8
	24-28	Weak Interactions	M6.1-5	Problem Set 9
	31-4	Electroweak Unification	M6.6-7	Problem Set 10
Nov.	7-11	Nuclear Structure Models	M7.1-5	Problem Set 11
	14-18	Decay Theory	M7.6-8	Problem Set 12
	21-25	<i>Thanksgiving</i>		
	28-2	Nuclear Applications	TR13 M8	Problem Set 13

Dec.	5-9	Future Prospects	M9	Problem Set 14
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In the event of inclement weather or other crises:

- Call the professor's voice mail, 610-330-5211, and check your email

Learning goals. Upon completion of this course, each student should:

- Understand the mathematics of four-vectors and tensors;
- Understand how electromagnetic waves propagate, are radiated and scatter;
- Have gained skill in problem-solving;
- Have gained skill in the use of numerical modeling of physical phenomena.

Texts:

- Martin, *Nuclear and Particle Physics: An Introduction, 2nd Ed.*, ISBN 978-0-470-74275-4
- Thornton & Rex, *Modern Physics for Scientists and Engineers, 4th Ed.*, ISBN 978-1-133-10372-1

Your grade will be based on:

- Written homework: 100%

Requirements:

- Homework problems: A full understanding of how to apply the mathematical formalisms comes only with much practise. Therefore homework problems are a crucial, probably the most crucial, part of this course. Assignments will be made weekly, due each Wednesday. It is essential to read the relevant sections of the text and review lecture notes thoroughly *before* you start to think about the homework problems. Feel free to discuss the problems with one another or (especially) with your instructor, but the paper you submit should represent your own understanding of the problems, written up independently after all discussions are complete. Group solutions are not acceptable. Papers that appear to have been copied from one another will be treated as academic dishonesty.

One homework set may be submitted late without penalty, but any additional sets submitted late will be down-rated by 10% for each week day following the due date. Homework sets submitted after the start of class on the due date will be considered one day late.

- **Computer Programs and Simulations:** More and more, physicists must use numerical techniques to solve problems. In many cases, it is their facility with incorporating the use of computers into a large-scale problem solution which makes physicists attractive to potential employers. So there will be occasional programming and/or simulation exercises, assigned as part of the weekly homework.
- **Attendance:** Regular class attendance is expected.

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**Federal Credit Hour Compliance Statement:**

- The student work in this course is in full compliance with the federal definition of a four credit hour course.

*This page is maintained by [Lyle Hoffman](#)*