

# Syllabus Particle Physics: Physics 364

## Lehigh University Department of Physics Winter 2017

Instructor: Professor Rosi Reed

Office: 406 Lewis Lab,  
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Text: *Introduction to Elementary Particles, 2<sup>nd</sup> ed*, by David Griffiths, 2008

Supplemental Text: *Modern Particle Physics 1st Edition*, by Mark Thompson, 2013

Class Times: MWF 9:10 in RM 511

Office Hours: Fridays, 10 am – 11 am, and by appointment

Course Requirements: General requirements include:

1. Attending all classes
2. Completing all assignments **on time**
3. Seeing me if you are having trouble!

Grading: Your numerical grade will be determined *approximately* as follows:

Homework	25%	You will be allowed to drop your two lowest homework scores
Midterm I	15%	
Midterm II	15%	
Final Project	15%	
Final Exam	30%	

Primary Topics

Special Relativity	Standard Model
Symmetries and Conservation Laws	Quantum Electrodynamics
Quantum Mechanics	Quantum Chromodynamics
Fermi's Golden Rule	Feynman Diagrams
Interaction of particles and matter	Nuclear models

Initial Competences:

1. Understand the connection between the wave-function and probability
2. Be able to perform basic calculations with special relativity
3. Understand the difference between full and partial derivatives

Final Competences:

1. Students will be able to determine whether a given reaction is possible, if not why and if so by which force the reaction happens.
2. Students will be able to accurately draw Feynman diagrams showing any possible reactions
3. Students will be able to do tree level QED calculations using Fermi's Golden rule.
4. Students will understand the connection between symmetries and conservation laws, and specifically how this corresponds to CPT symmetries
5. Students will demonstrate a basic understand of the Standard Model of particle physics

Final Project – The final project will be a paper on a modern topic in particle or nuclear physics. It will require Latex, so it is recommended that those who are not familiar with Latex download it and use it beforehand.

***Accommodations for Students with Disabilities:***

*If you have a disability for which you are or may be requesting accommodations, please contact both your instructor and the Office of Academic Support Services, University Center C212 (610-758-4152) as early as possible in the semester. You must have documentation from the Academic Support Services office before accommodations can be granted.*

***The Principles of Our Equitable Community:***

*Lehigh University endorses The Principles of Our Equitable Community (<http://www4.lehigh.edu/diversity/principles>). We expect each member of this class to acknowledge and practice these Principles. Respect for each other and for differing viewpoints is a vital component of the learning environment inside and outside the classroom.*