

Physics 686 – Phenomenology of Particle Physics – Fall 2018

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Office hours: M,W,F 10:00-11:30 (or whenever you can find me)

Home page: <http://www.niu.edu/spmartin/phys686/>

Class meetings: M,W,F 9:00-9:50 in 227 La Tourette.

Graduate Catalog Description: Advanced topics in the standard model of quarks, leptons, gauge bosons and their fundamental interactions. Particle production and decay phenomenology.

Textbook: There is no official textbook for this course. Instead, lecture notes that correspond very closely to the course material will be provided electronically, linked from the course web page. The lecture notes will feature a table of contents, an index, and appendices with useful references. Comments, corrections, and missing index entries for the lecture notes will be greatly appreciated.

Another useful resource is the Particle Data Group's "Review of Particle Properties" and its on-line version at <http://pdg.lbl.gov/>. The whole RPP is a very large file, but individual sections can be downloaded, and the PDG live section is in html. You can even order your own free hard copy there, if you really hate trees.

Near the end of the lecture notes is a list of other books that you may find useful, although I will not closely follow any of these books.

Topics to be covered: We will treat modern particle physics, using some of the language of quantum field theory but without completely developing the formal ideas of quantum field theory. We will aim to understand the Standard Model of particle physics, and how to compute cross-sections and decay rates. For a detailed outline, see the table of contents of the lecture notes. I *strongly* urge you to take notes in class, even though I will very closely follow the lecture notes.

Grading: Homework sets assigned about once per week will account for 100% of your course grade. **There is a good chance you would be able to find solutions to at least some of the homework questions on the internet, or from other people who have taken this course or similar courses. But don't! You are on your honor to not get the answers that way. You are encouraged to consult with each other, and me, regarding strategy on the homework. However, do not turn in anything that you have copied from another student or from outside**

sources, or anything that you do not completely understand. Show your work! Neatness, organization, and clarity count! Homeworks should be submitted on single-sided paper. Electronic submission of homework is not allowed. Late penalty policy: 10% off for each day after the due date, up to 1 week; 100% off after 5 days. Late means after 4:30 PM.

Grades will be assigned according to your numerical score as a percentage, with the low cutoff for each grade as follows:

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|---------|---------|---------|--------|
| A 90%, | A- 87%, | B+ 83%, | B 80%, |
| B- 75%, | C+ 70%, | C 60%, | D 50%. |

I reserve the right to amend the above grading scale to be more lenient, but it is guaranteed not be made more strict.

Accessibility Statement: Northern Illinois University is committed to providing an accessible educational environment in collaboration with the Disability Resource Center (DRC). Any student requiring an academic accommodation due to a disability should let his or her faculty member know as soon as possible. Students who need academic accommodations based on the impact of a disability will be encouraged to contact the DRC if they have not done so already. The DRC is located on the 4th floor of the Health Services Building, and can be reached at 815-753-1303 (V) or drc@niu.edu.