

Physics 686 – Phenomenology of Particle Physics – Fall 2021

Instructor: Prof. S. Martin email: spmartin@niu.edu

Class meetings: M,W,F 10:00-10:50 in Faraday 237.

Contingency: Due to the pandemic, it is quite possible that this class will go online only. This may happen with short notice. If so, lectures will be on Zoom, at a Meeting ID provided by email to registered students. If you haven't already done so, please make sure now that you have a Zoom client installed and tested on your favorite device. If online lectures take place, they will be recorded and available on youtube within a few hours, in case your internet connection fails. In-person lectures will not be recorded.

Office hours: Immediately after class, or on Zoom by appointment (short notice is fine).

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

There is no Blackboard web page for this course. Everything relevant will be either sent to you by email, or linked to on the web page above, in pdf form.

Textbook: Typeset notes in pdf form, which will be sent to you (free!) by email on the first day of class. These notes will have a clickable table of contents, index, and equation numbers. Please do not distribute them to anyone. Comments, corrections, and missing index entries for the lecture notes will be greatly appreciated. No other textbook is required.

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. Each homework set should be turned in by email as a single pdf file. NIU's copy machines provides a convenient way to scan your homeworks and have them automatically emailed to you. (The file size and quality will usually be much better than if you take a picture on your phone.) Please be neat and legible, and leave enough space for grading notes and corrections. Graded homeworks will be returned by email. No paper submission of homeworks will be accepted. Show your work! Neatness, organization, and clarity count! Late penalty policy: 10% off for each day after the due date, up to 4 days; 100% off after 4 days. Late means after midnight on the due date. You are encouraged to consult with each other, and with me, on the homework. **However,**

each of you must turn in only your own work. Do not turn in anything that you have copied, or anything that you do not understand. Do not use Chegg or any similar service, or send any materials from this course to such services, or get homework solutions from students outside or inside of NIU who may have previously taken this course or its equivalents at other institutions. In particular, the notes and homework sets for this class should not be distributed to, or discussed with, anyone other than your peers in this class and your instructor.

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

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.