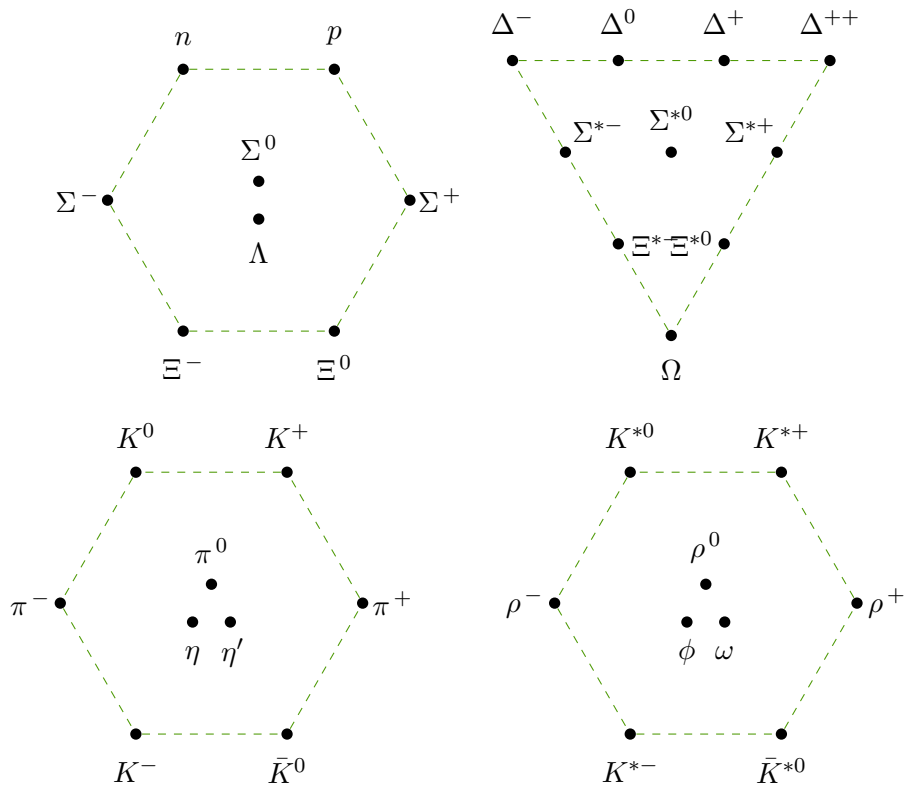


Physics 380: Introduction to Particle Physics

Spring 2017



This course provides an introduction to the Standard Model of Particle Physics. The topics that we will cover include symmetries, conservation laws, scattering, accelerator physics, and the theories that describe the electromagnetic, weak, and strong interactions.

Basic Information

WHO AM I: Dr. Robert McNees. I'm the professor. You can call me "Bob" or "Dr. McNees" – I'm not picky about that.

EMAIL: rmcnees@luc.edu. You *must* use your "@luc.edu" address when sending me an email. Emails sent from outside accounts (like gmail) sometimes get blocked by Loyola's mail servers!

OFFICE: Cudahy Science 308. "Official" office hours will be announced, but for the most part I have an open-door policy and you can drop by anytime. If you have a busy schedule and want to make sure I'm there, you can email or call my office phone at 508-7570.

LECTURES: Tuesday and Thursday from 2:30-3:45 in Cudahy $\pi \times 10^2$.

WEBSITE: <http://jacobi.luc.edu/p380.html>.

Textbook and Other References

The main text for the class is *Introduction to Elementary Particles* (2nd edition) by David Griffiths. Homework assignments are not taken from the book, so you'll probably be fine with the 1st edition if that's available to you. The tone of this book is just as casual and accessible as his E&M book.

There are lots of useful books that you might want to consult as backups. One is *An Introduction to Particle Physics and the Standard Model* by Robert Mann (CRC Press). Another useful book is *Introduction to High Energy Physics*, by D. Perkins. Neither of these is required. You can also find very helpful and informative notes all over the internet. I will post some of these – ones I find especially useful – on the course website. If you aren't sure about the quality or relevance of a particular reference feel free to ask my opinion.

From time to time I may supplement the material from the book with my own notes. I will post these notes as pdf files on the class website.

Grades

Grades in the course are primarily determined by homework, followed by exams. There will be five homework assignments that account for 50% of your final grade in the class, a midterm exam (date TBA) worth 20%, and a final exam worth 25%. The final exam will be due at 9 a.m. on Monday, December 8th (the scheduled final exam time for the course). The remaining 5% depends on your attendance and participation. To receive the full 5% you should do two things that show me you are engaging the material and thinking about what we're doing. First, you must regularly attend lectures. Second, you should ask questions. This can happen either in class, discussion, or office hours. There is no minimum number of questions you need to ask, and if you don't like to speak up in class you can ask them during office hours. In any case, you *must* visit me during office hours at least once during the semester, with a question related to something we've done in class. As long as you do these things, you get the 5%.

Once your grades have been added up and converted to a percentage, your final grade will be assigned according to the following table:

Percentage	Letter Grade
100 – 92	A
91 – 90	A–
89 – 88	B+
87 – 82	B
81 – 80	B–
79 – 78	C+
77 – 72	C
71 – 70	C–
69 – 68	D+
67 – 62	D
61 – 0	F

This is my first time teaching the course, so I reserve the right to curve grades if I feel that assignments are too challenging. However, I will never curve grades *down*: your grade will never be lower than the

grade you receive from the algorithm described above.

Homework Assignments

There will be five homework assignments over the course of the semester. Assignments can be downloaded from the course website – I will not hand out printed copies in class. A typical assignment will consist of three or four problems, and they will all be graded. Homework is the single largest component of your grade, so take it seriously! It usually takes a good amount of time, which means you need to plan accordingly. Don't put it off until the last minute.

Working with your classmates is encouraged, but you should only hand in work that you've completed on your own. If your solutions look like they were copied from someone else's work then you need to go back and redo it from scratch. If you can't explain each step of your solution then you haven't completed the problem on your own. This is a challenging class, and completing the homework is the only way to prepare for the exams.

A Warning

Never, ever hand in an assignment that you copied from a solutions manual or found online. You won't learn anything that way, and it will earn you a grade of zero for that assignment. If it happens more than once it will be reported to the Department Chair and the Dean. Consider yourself warned.

College of Arts & Sciences Statement on Academic Integrity

[Read the statement on the CAS website](#)

A basic mission of a university is to search for and to communicate the truth as it is honestly perceived. A genuine learning community cannot exist unless this demanding standard is a fundamental tenet of the intellectual life of the community. Students of Loyola University Chicago are expected to know, to respect, and to practice this standard of personal honesty.

Academic dishonesty can take several forms, including, but not limited to cheating, plagiarism, copying another student's work, and submitting false documents.

Academic cheating is a serious act that violates academic integrity. Cheating includes, but is not limited to, such acts as

- Obtaining, distributing, or communicating examination materials prior to the scheduled examination without the consent of the teacher
- Providing information to another student during an examination
- Obtaining information from another student or any other person during an examination
- Using any material or equipment during an examination without consent of the instructor, or in a manner which is not authorized by the instructor

- Attempting to change answers after the examination has been submitted
- Unauthorized collaboration, or the use in whole or part of another student's work, on homework, lab reports, programming assignments, and any other course work which is completed outside of the classroom
- Falsifying medical or other documents to petition for excused absences or extensions of deadlines
- Any other action that, by omission or commission, compromises the integrity of the academic evaluation process

Plagiarism is a serious form of violation of the standards of academic dishonesty. Plagiarism is the appropriation of ideas, language, work, or intellectual property of another, either by intent or by negligence, without sufficient public acknowledgement and appropriate citation that the material is not one's own. It is true that every thought probably has been influenced to some degree by the thoughts and actions of others. Such influences can be thought of as affecting the ways we see things and express all thoughts. Plagiarism, however, involves the taking and use of specific words and ideas of others without proper acknowledgement of the sources, and includes the following

- Submitting as one's own material copied from a published source, such as print, internet, CD-ROM, audio, video, etc.
- Submitting as one's own another person's unpublished work or examination material
- Allowing another or paying another to write or research a paper for one's own benefit
- Purchasing, acquiring, and using for course credit a pre-written paper

The above list is in no way intended to be exhaustive. Students should be guided by the principle that it is of utmost importance to give proper recognition to all sources. To do so is both an act of personal, professional courtesy and of intellectual honesty. Any failure to do so, whether by intent or by neglect, whether by omission or commission, is an act of plagiarism. A more detailed description of this issue can be found [here](#).

In addition, a student may not submit the same paper or other work for credit in two or more classes without the expressed prior permission of all instructors. A student who submits the same work for credit in two or more classes without the expressed prior permission of all instructors will be judged guilty of academic dishonesty, and will be subject to sanctions described below. This applies even if the student is enrolled in the classes during different semesters. If a student plans to submit work with similar or overlapping content for credit in two or more classes, the student should consult with all instructors prior to submission of the work to make certain that such submission will not violate this standard.

Plagiarism or any other act of academic dishonesty will result minimally in the instructor assigning the grade of "F" for the assignment or examination. The instructor may impose a more severe sanction, including a grade of "F" in the course. All instances of academic dishonesty must be reported by the instructor to the chairperson of the department involved, and to the Dean of the College of Arts and Sciences.

The chairperson may constitute a hearing board to consider the imposition of sanctions in addition to those imposed by the instructor, including a recommendation of expulsion, depending on the seriousness of the misconduct. In the case of multiple instances of academic dishonesty, the academic dean of the

student's college may convene a hearing board. Students have the right to appeal the decision of the hearing board to the academic dean of the college in which they are registered. The decision of the dean is final in all cases except expulsion. The sanction of expulsion for academic dishonesty may be imposed only by the Provost upon recommendation of a dean.

Students have a right to appeal any finding of academic dishonesty against them. The procedure for such an appeal can be found [here](#).

The College of Arts and Sciences maintains a permanent record of all instances of academic dishonesty. The information in that record is confidential. However, students may be asked to sign a waiver which releases that students record of dishonesty as a part of the students application to a graduate or professional school, to a potential employer, to a bar association, or to similar organizations.