University of Minnesota
School of Physics and Astronomy

Introduction to Nuclear and Particle Physics: Spring 2016

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Class Website (select 4511) http://www.physics.umn.edu/classes/
This is the main website for all postings, announcements, grades, and homework.

Introduction
The goal of the course is to survey particle and nuclear physics at the undergraduate level. In order to give a broad exposure to the various topics in these fields, it will be impossible to go into full detail on every topic. However, a general understanding of the concepts should be obtained, with the interested student being encouraged to seek a deeper understanding with future courses in topics such as Quantum Field Theory. The course explores the common roots and tools of nuclear (medium energy) and particle (high energy) physics. The main objective is to develop an understanding of the Standard Model of quarks, leptons, and the fundamental interactions of the universe. Specific topics include the techniques of particle and nuclear experiments, properties and simple models of nuclei, fundamental interactions and their mediators, quarks and leptons, symmetries and tests of conservation laws, and indications of physics beyond the Standard Model.

Mathematical rigor is not an essential feature, but the ability to do calculations of particle and nuclear phenomena is an important goal. The knowledge and skills learned in Physics 4101 are assumed, but competence at the level of Physics 2601/2605 is generally adequate.

Required Texts:
D. Griffiths, Introduction to Elementary Particles. 2nd Revised Ed. Wiley-VCH
PDG Handbook: http://pdg.lbl.gov/

Lectures: MWF from 9:05 – 9:55 in PAN 110

Final Exam: This is a 3-hr exam on Thursday, May 12 1:30-3:30
**Midterms:** There will be two midterm exams, which will consist of a few conceptual questions plus worked problems. The problems will closely resemble the weekly HW problems. Scheduled on Mondays: Feb 22, April 18

**Homework:** There will be HW problems due on Monday, normally every week, but occasionally there will be 2-week assignments. The answers will be posted by Wednesday with some commentary on misconceptions or common errors found in your papers. Your papers will be returned the following week.

**Grading:**

Homework = 30%
Final Exam = 40%
Each Midterm = 15%

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**Responsibilities:**
Students are responsible for all information disseminated in class and all course requirements, including deadlines and examinations. Derivations similar to what can be found in your textbooks and examples on the board will **not** be transcribed, scanned, and posted online, although some powerpoint presentations will be posted. Therefore, class attendance is very important. While I have assigned office hours, you should feel free to make an appointment outside of those hours if you are having problems or if you have questions.

The work that you submit in the homework and exams must be your own and must follow the rules given for the particular examination. Any indication that you have received improper assistance will result in penalties ranging from a zero on the exam to expulsion from the University. We have been asked by the Dean to include the following statement for your information:

*The University of Minnesota assumes that all students enroll in its programs with a serious learning purpose and expects them to be responsible individuals who demand of themselves high standards of honesty and personal conduct. All students are expected to behave at all times with the utmost respect and courtesy toward all of their fellow students, their instructors and are expected to have the highest standards of honesty and integrity in the academic performance of its students. Any attempt by a student to present work that she or he has not prepared, or to pass an examination by improper means, is regarded by the faculty as a serious offense, which may result in the immediate expulsion of the student. Aiding and abetting a student in an act of dishonesty is also considered a serious offense.*

**DEPARTMENTAL POLICIES**
ATHLETES must provide their official University of Minnesota athletic letter containing the approved competition schedule to their instructor and the Physics undergraduate program staff in Williamson 145. Away exams will be arranged with the athletic adviser traveling with the team. Accommodations will be made for official university sports only (i.e. no accommodations will be made for intramurals, club sports, etc.)
DISABILITY SERVICES: If you have accommodations for this course, please provide the Physics undergraduate program staff in Williamson 145 with a copy of your accommodation letter for the current semester. Exams will be arranged according to accommodations and sent to the testing center for administration.

STUDENT CONDUCT CODE: The University seeks an environment that promotes academic achievement and integrity, that is protective of free inquiry, and that serves the educational mission of the University. Similarly, the University seeks a community that is free from violence, threats, and intimidation; that is respectful of the rights, opportunities, and welfare of students, faculty, staff, and guests of the University; and that does not threaten the physical or mental health or safety of members of the University community.

Note that the conduct code specifically addresses disruptive classroom conduct, which means "engaging in behavior that substantially or repeatedly interrupts either the instructor's ability to teach or student learning. The classroom extends to any setting where a student is engaged in work toward academic credit or satisfaction of program-based requirements or related activities."

SCHOLASTIC DISHONESTY: You are expected to do your own academic work and cite sources as necessary. Failing to do so is scholastic dishonesty. Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering, forging, or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis. If it is determined that a student has cheated, he or she may be given an "F" or an "N" for the course, and may face additional sanctions from the University. For additional information, please see http://policy.umn.edu/Policies/Education/Education/INSTRUCTORRESP.html

The Office for Student Conduct and Academic Integrity has compiled a useful list of FAQ pertaining to scholastic dishonesty:
http://www1.umn.edu/oscai/integrity/student/index.html

If you have additional questions, please clarify with your instructor for the course. Your instructor can respond to your specific questions regarding what would constitute scholastic dishonesty in the context of a particular class, e.g. whether collaboration on assignments is permitted, requirements and methods for citing sources, if electronic aids are permitted or prohibited during an exam.

DISABILITY ACCOMMODATIONS: The University is committed to providing quality education to all students regardless of ability. Determining appropriate disability accommodations is a collaborative process. You as a student must register with Disability Services and provide documentation of your disability. The course instructor must provide information regarding a course's content, methods, and essential components. The combination of this information will be used by Disability Services to determine appropriate accommodations for a particular student in a particular course. For more information, please reference Disability Services:
http://ds.umn.edu/student-services.html
PERSONAL ELECTRONIC DEVICES: Using personal electronic devices in the classroom setting can hinder instruction and learning, not only for the student using the device but also for other students in the class. To this end, the University establishes the right of each faculty member to determine if and how personal electronic devices are allowed to be used in the classroom.

MAKEUP WORK: Students will not be penalized for absence during the semester due to unavoidable or legitimate circumstances. Such circumstances include verified illness, participation in intercollegiate athletic events, subpoenas, jury duty, military service, bereavement, and religious observances. Such circumstances do not include voting in local, state or national elections. For complete information, please see: http://policy.umn.edu/Policies/Education/Education/MAKEUPWORK.html