

**Physics 325: Nuclear Physics**  
Spring 2009

**Instructor:** Elizabeth George, Science 308B, 327-7854, [egeorge@wittenberg.edu](mailto:egeorge@wittenberg.edu)

**Office hours:** See schedule on my door and on the Web, or by arrangement

Class meets 8:00-9:30 a.m. Tuesday/Thursday, KSC 304 (1<sup>st</sup> half of semester)

Course Web page: <http://userpages.wittenberg.edu/egeorge/Phys325.html>

**Required course materials:**

*Textbook:* An Introduction to Nuclear Physics, WN Cottingham and DA Greenwood, 2<sup>nd</sup> ed.

<b>Grading policy:</b>	Midterm exam .....	20 %
	Final exam .....	30 %
	Assignments .....	40 %
	Quizzes .....	<u>10 %</u>
	TOTAL	100%

Letter grades will be assigned according to the percentage of possible points you have accumulated at the end of the semester. You are guaranteed that the divisions between grades will be no higher than the following:  $90\% \leq A \leq 100\%$ ,  $80\% \leq B < 90\%$ ,  $70\% \leq C < 80\%$ ,  $60\% \leq D < 70\%$ ,  $F < 60\%$ . Scores within 3 points of a boundary will receive a + or – grade. In borderline cases, attendance, class participation, and trend in exam scores will be used to decide whether to award the higher grade.

**Exams:** Exams will cover material from the readings, assignments, and in-class work, including labs. The exams will comprise two types of questions: quantitative questions, and qualitative (conceptual) questions. If you have a legitimate conflict with a scheduled exam, or are ill the day of the exam, you must let me know ahead of time (leave a message or send email if I'm not in) to be eligible for a makeup exam. "Legitimate conflict" means a University-sanctioned event or other unavoidable and documented event.

**Assignments:** Homework will be assigned about once a week. Late homework will be accepted until the graded assignment is returned or solutions are made available (typically the next class period), but with a 25% penalty (unless negotiated ahead of time). You are encouraged to talk about homework problems with each other, but the work you turn in must be your own. The lowest homework assignment score will be dropped.

**Disabilities:** If you have a documented disability and need to arrange reasonable accommodations, please contact me as soon as possible. Retroactive accommodations will not be given. Please contact Melinda Finkle, Academic Coordinator, [mfinkle@wittenberg.edu](mailto:mfinkle@wittenberg.edu), 327-7924, Room 203 Recitation Hall, to coordinate accommodations and receive self-identification letters for each professor.

**Quizzes:** Each day (when there isn't an exam) there will be a brief quiz during class. The quiz will cover fundamental concepts. The lowest quiz score will be dropped. No makeup quizzes will be given except in the case of excused absences.

**Tentative Schedule:**

<b>Date</b>	<b>Topics</b>	<b>Sections</b>
WEEK 1		
January 13	Basic concepts: structure of matter and fundamental forces	1.1-1.3, 2.1-2.4
January 15	Weak interaction and beta decay; strong interaction and quarks	2.5-2.6, 12.1, 3.1-3.2
WEEK 2		
January 20	Nuclear forces and beta decay in more detail	3.3-3.6
January 22	Nuclear sizes and masses; liquid drop model	4.1-4.5
WEEK 3		
January 27	Systematics of stable nuclei and of alpha, beta decay	4.6-4.8
January 29	Nuclear structure: the shell model	5.1-5.4
WEEK 4		
February 3	Alpha decay and spontaneous fission	6.1-6.3
February 5	<i>Exam 1</i>	<i>Ch. 1-6</i>
WEEK 5		
February 10	Excited states of nuclei; gamma decay and internal conversion	7.1-7.3; 12.8, 12.9
February 12	Nuclear reactions	8.1-8.4
WEEK 6		
February 17	Fission	9.1-9.4
February 19	Fusion	10.1-10.4
WEEK 7		
February 24	Fission and fusion reactors	9.5-9.9; 10.6
February 26	Stellar nucleosynthesis	11.1-11.4
WEEK 8		
March 3	Interaction of energetic particles with matter; radiation and life	Supplemental material, 15.1-15.6

Comprehensive final exam: to be arranged