Course Information

PHYS 2604 Modern Physics Fall 2009

Professor: Pat Kalyniak
Room 3310, Herzberg
613 520-4376
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Prerequisites: The prerequisites for this course are PHYS 1001 and PHYS 1002, or PHYS 1003 and PHYS 1004 (PHYS 1007 and PHYS 1008 are also acceptable provided a minimum average grade of B^- is presented); plus MATH 1004 and MATH 1104 or MATH 1007 and MATH 1107, or MATH 1002 and MATH 1102.

Lectures: Tuesday and Thursday (Tory 446) 4:35 – 5:55

Labs: Instructor: Penka Matanska
A8 – Tuesday 1:05 – 3:55 or
A12 – Monday 1:05 – 3:55
Location: Herzberg 3145
The labs begin the week of September 14. The lab manual will be available in the Chemistry Stores as of late August. You will need a log book for data taking (the black cover physics notebook).

Office Hours: Tuesdays and Wednesdays at 10:30 or by appointment
(email me to set up time)

Text: Stephen T. Thornton and Andrew Rex, "*Modern Physics for Scientists and Engineers*", 3rd edition, Thomson – Brooks/Cole, 2006, ISBN: 0 – 534 – 41781 – 7

Website: http://www.physics.carleton.ca/~kalyniak/phys2604/index.html

Marks:

Assignments	20%	
Midterm Exam	15%	(1.5 hours)
Laboratory	30%	(short reports 20%, formal reports 40%, in lab work 40%)
Final Exam	35%	(3 hours)

A passing grade in the lab is required to pass the course.

Course Material:

The course deals with many of the concepts involved in the development of our understanding of the world at the microscopic level, of special relativity and quantum mechanics and their applications in the study of atomic and nuclear physics. The introduction of topics is primarily done historically in order to follow the lines of thought leading to the new physics concepts. This approach also allows us to see how reasoning based on classical physics was questioned when in conflict with experiment and, subsequently, how progress was made.

Most of the course topics are found in Chapters 1 through 5, 9, and 12 of the textbook. However, the course material is defined by the lectures, which will supplement that covered in the text.

Development of atomic view of matter; Kinetic theory; Electron properties

Special relativity; Lorentz transformations; Relativistic kinematics

Photoelectric effect; Radiation; Planck's law

Rutherford scattering; Bohr atom; Atomic spectra

X-rays; Compton scattering

Wave properties of matter

Statistical physics

Atomic nucleus; Radioactivity

- There will be approximately 9 assignments given out. They are due in class one week after their distribution, or as announced in class. Late assignments will not be accepted without an acceptable reason such as illness. You are encouraged to discuss the problem assignments with other students in this course. However, the work you turn in must be your own. You are also encouraged to consult me when you have questions about the assignments. They are a critical part of the course; figuring out the assignment problems is the best way to learn the material.

- Your homework solutions should be thorough, self-contained, and logical. Explain your steps. Your homework assignments must be legible in the judgment of the marker.

- The midterm exam will be 1.5 hours long, given during the lecture period.

- The final exam will be 3 hours long, given during the final examination period in December.

- All exams will be closed book. An 8.5" x 11" crib sheet will be allowed for the final exam only.

- The exact format of the exams will be discussed well in advance. In the event that a deferred exam is necessary for a student, that exam will replace only the Final Exam component of the course mark and will only be granted if adequate term work has been completed. A grade of FND will be given in the event of inadequate term work, which constitutes earning 15 or less of the 65 possible term marks.

- Feel free to email me with questions during the course or to set up a time to meet.

Reading:

Please read Chapter 1, “The Birth of Modern Physics”, of your textbook, for an overview of the first topics we will discuss. In order to mesh well with your laboratory, we will subsequently study the material in the first two sections of Chapter 3.

For Department policies, please see http://www.physics.carleton.ca/undergrad/academic_policy.html This link contains information regarding the issues of Plagiarism and of Academic Accommodation. **It is your responsibility to read these policies.** There is also a section on Academic Integrity in your updated 2009-2010 Undergraduate Handbook, produced by Prof. Logan.

Copying, Plagiarism and other Forms of Cheating

The attention of all students is drawn to section E.14 of the Academic Regulations of the University: http://www.carleton.ca/cuuc/regulations/acadregsuniv14.html

Academic Accommodation

You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

Pregnancy obligation: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website:
http://carleton.ca/equity/accommodation/student_guide.htm

Religious obligation: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website: http://carleton.ca/equity/accommodation/student_guide.htm

Students with disabilities requiring academic accommodations: in this course must register with the Paul Menton Centre for Students with Disabilities (PMC) for a formal evaluation of disability-related needs. Documented disabilities could include but are not limited to mobility/physical impairments, specific Learning Disabilities (LD), psychiatric/psychological disabilities, sensory disabilities, Attention Deficit Hyperactivity Disorder (ADHD), and chronic medical conditions. Registered PMC students are required to contact the PMC, 613-520-6608, every term to ensure that I receive your *Letter of Accommodation*, no later than two weeks before the first assignment is due or the first in-class test/midterm requiring accommodations. If you only require accommodations for your formally scheduled exam(s) in this course, please submit your request for accommodations to PMC by the last official day to withdraw from classes in each term. For more details visit the PMC website:
http://www.carleton.ca/pmc/students/acad_accom.html

> **"Undergraduate Administrator** - Joanne Martin is the Undergraduate Administrator in the Department of Physics and is located in Room 3302 HP, telephone 520-2600, ext. 1023 or email joanne_martin@carleton.ca . Joanne can assist you with information about prerequisites and preclusions, inquiries about course substitutions/equivalencies, understanding your academic audit and remaining requirements for graduation. She can also refer you to the appropriate resources on campus such as the Student Academic Success Centre (SASC), Science Student Success Centre (SSSC) Writing Tutorial Centre, Registrar's Office, etc."