Phys 335: "Modern Physics", fall 2017

Course Information:

Instructor: Dr. L. Gan
Office: DL Rm. #201A
Tel: 962-3583
E-mail: ganl@uncw.edu
Web site: http://people.uncw.edu/ganl/phy335/index.htm

Classes meet: Tue & Thur at 12:30pm-1:45pm, DL 101
Wed at 12:00pm-12:50pm, DL 213

Office hours: Tue. 2:00pm-5:30pm
Wed. 1:00pm-2:30pm
Other hours by appointment

Required Text:

"Modern Physics", by R. Serway, C. Moses and C. Moyer, the 3rd edition (Brookes/Cole Thomson Learning Company)

Supplementary Readings:

"Nonclassical Physics---Beyond Newton's View", by R. Harris
"Concepts of Modern Physics", by A. Beiser

Course Description and Learning Outcomes:

This course will cover fundamental topics in modern physics, which includes special relativity, quantum mechanics, atomic and nuclear physics. Students will gain basic understanding on physical concepts, such as the relationship of the space and time, the structure of matter, and the principle of quantum mechanics with extensive applications in science and engineering.

Important!!!

You must read ahead of the lecture. Weekly reading assignment is given below in the course outline. A few conceptual questions will be given at the beginning of each class. You will be much better prepared for those questions if you have read the material before we begin them**. Up to 5 bonus points** will be given to students who are actively involved in the class room discussion and answer the questions correctly. The course will move at a fast but steady pace and it is your responsibility to keep up with the lectures.

Homework:

Approximately 3-7 problems will be assigned every week. Homework will be **collected on Thursday during the class** in one week after each assignment is

announced. The solution of the homework will be posted on the web at the end of each homework period. The work of three students will be randomly selected to be graded each time. The average of graded homework will be added to the final score. On the other hand, **a missing homework will result a deduction of 0.5% from the final score**. Show all works clearly. **Late homework will not be accepted**. It is absolutely essential that you work out the assigned problems. You are encouraged to talk and work with others about the problems, especially after you've made a first attempt at them by yourself. The final write-up, however, should be yours completely--and in it, you should name your collaborators or sources you've used, as well as write and sign the honor code "I affirm that I have adhered to the honor code in this assignment."

Project assignment:

By 11:59 pm on **Nov. 17**, you need submit (through e-mail) a written paper at least 3 pages concerning a specific issue in modern physics. The topic is of your choosing, but it must relate to principles we have learned in the modern physics classes and has at least one appropriate published reference. The project can be any of the following: measure a physical constant or test of one of principles, do a numerical simulation of a complex physical problem, review a scientific discovery or an application which is based on modern physics concepts. You are encouraged to discuss your proposed project with the instructors or other students in the class. Each project will be graded according to its description of the physics underlying, design and execution of the experiment, and analysis/description of the results. Creativity will be rewarded!

Learning Outcomes:

- Summarize project, using knowledge of the results/findings, in a paper that explores linkages between a project's results and any societal, legal or economic implications of the study.
- Evaluate and synthesize information from various sources to understand a testable hypothesis as part of a written project.
- Use the library catalogue, online indexing databases, and appropriate reference collections to locate relevant sources of information and/or data.
- Use appropriate technologies and methodologies to collect data required to test hypotheses generated as part of a written project.

Examinations:

There will be two tests during the semester and a three-hour comprehensive final exam. The exams will consist of a mixture of multiple choice, conceptual questions, and selected problems. The tentative dates of these exams are given below in the course outline. Do not miss any of the exams.

Make-up Exams:

There will be no make-up exams. In case of evidence of extraordinary circumstance, each case will be discussed and evaluated on an individual basis. No general policy will apply to the class as a whole.

Score:

Homework:	10%
Project assignment:	10%
Two midterm exams:	40%
Final examination:	40%
Bonus points for class room discussions:	5%

Grading scale:

90 -100 ……..……. …… A
80 - 89 ……...…. .B
70 - 79 …….....C
60 - 69 …….. D
Below 60 ..……. F

Attendance:

YOU ARE EXPECTED TO ATTEND ALL OF THE LECTURES! Your final grade will be dropped by **half a letter grade** if you have more than five absences. The "**F**" grade will be given if you have more than ten absences. No absences can be excused. Attendance will be taken at the beginning of each class and will be closed 10 minutes after the class starts. Please do not be late!

Academic Integrity:

All members of UNCW's community are expected to follow the academic Honor Code. Please read the UNCW Honor Code carefully (as covered in the UNCW Student Handbook). Academic dishonesty in **any** form will not be tolerated in this class.

Disability Services:

Students with diagnosed disabilities should contact the Office of Disability Services (962-7555). Please give me a copy of the letter you receive from Office of Disability Services detailing class accommodations you may need. If you require accommodation for test-taking please make sure I have the referral letter no less than three days before the test.

Violence and Harassment:

UNCW practices a zero tolerance policy for any kind of violent or harassing behavior. If you are experiencing an emergency of this type contact the police at 911 or UNCW CARE at 962-2273. Resources for individuals concerned with a violent or harassing situation can be located at http://www.uncw.edu/wsrc/crisis.html.

University Learning Center:

910.962.7857
www.uncw.edu/ulc

The University Learning Center's (ULC) mission is to help students become successful, independent learners. Tutoring at the ULC is NOT remediation: the ULC offers a different type of learning opportunity for those students who want to increase the quality of their education. ULC services are free to all UNCW students and include the following:
--Learning Services (Basic Studies) http://www.uncw.edu/ulc/learning/index.html
--Math Services http://www.uncw.edu/ulc/math/index.html
--Study Skills http://www.uncw.edu/ulc/study/index.html
--Supplemental Instruction http://www.uncw.edu/ulc/si/index.html
--Writing Services http://www.uncw.edu/ulc/writing/index.html

Phys 335: "Modern Physics" – Course Outline:

Date	**Topic**	**Text Reference**
Week 1 (Aug. 16)	Introduction to Modern Physics	Chapter 1
Week 2 (Aug. 22)	Principle of Relativity and the Lorentz Transformation	Chapter 1
Week 3 (Aug 29)	Relativistic Energy and Momentum	Chapter 2
Week 4 (Sept. 5)	Duality of the Light	Chapter 3
Week 5 (Sept. 12)	Duality of the Matter	Chapter 4
Week 6 (Sept. 19)	Wave groups & Uncertainty Principle	Chapter 5
Week 7 (Sept.. 26)	**Exam 1**	**Chapter 1-4**
Week 8 (Oct 3)	Stationary States & Energy Quantization	Chapter 6
Week 9 (Oct 10)	Probabilities & Expectation Values	Chapter 6
Week 10 (Oct 17)	Tunneling Phenomena	Chapter 7
Week 11 (Oct 24)	Central Forces and Angular Momentum	Chapter 8
Week 12 (Oct 31)	Atomic Hydrogen and Hydrogen-Like Ions	Chapter 8
Week 13 (Nov 7)	Electron Orbital Magnetism and Spin	Chapter 9
Week 14 (Nov 14)	**Exam 2**	**Chapter 5-9**
Week 15 (Nov 21)	Nuclear Structure	Chapter 13
Week 16 (Nov 28)	Elementary Particles	Chapter 15
Dec 8	**Final exam (11:30am-2:30pm)**	**All chapters**

This schedule is subject to change.