

**LAGUARDIA COMMUNITY COLLEGE
CITY UNIVERSITY OF NEW YORK
NATURAL SCIENCES DEPARTMENT**

**SCP160.0560 – FOUNDATIONS FOR THE PHYSICAL SCIENCES
FALL I, 2015**

LECTURES/RECITATIONS: WEDNESDAYS 4:35 – 7:55 pm Room: M155

INSTRUCTOR: Professor J. Nieman (niemanja@lagcc.cuny.edu) (718) 482-5754

TEXT: Custom of books by Walker and Troh. ISBN: 978-1-269-27608-5

GENERAL DESCRIPTION: This course focuses on the fundamental principles of Physics and Chemistry that form the foundation for College-level, one-year courses in these disciplines, as well as in Biology, that are typically gateway offerings for careers in Physical Therapy, Medicine, Dentistry, Pharmacy and the Natural Sciences, among others. The aim of this course is to insure that the students are exposed to the scientific background necessary to continue in their studies of the Natural Sciences. It is therefore particularly useful for students who have not taken a Regents-based Chemistry or Physics course in high school, or have taken these a long time ago. The lectures will emphasize examination of the principles in detail. However, a considerable amount of class time will be devoted to problem-solving. The problems will not merely be solved, but also analyzed with emphasis on recognizing how the relevant scientific principles lead to the mathematical formalism required to arrive at the answer. This integration of principles and applications will be paramount throughout the course.

COURSE OBJECTIVES:

- **To understand how the relationship between experiments and theory in doing science – particularly Chemistry and Physics – is accomplished by implementing the scientific method.**
- **To recognize the central role that measurements play in scientific development and evolution.**
- **To learn fundamental principles of Physics and Chemistry that help us understand nature and how our world works.**
- **To appreciate how scientific principles learned can be applied to understand and solve complex problems. Thus, for instance, from the observation and understanding of Thermodynamic Principles to the practical solutions of energy production via efficient and clean methods.**

GRADING SYSTEM:

2 Lecture Exams (200 points each)	400 points
EXAM # 3 (Chemistry Final)	300 points
Quizzes (2)	100 points
Assignments and Activities	200 points

TOTAL	1000 points

The Physics exams will not be comprehensive, although certain principles and techniques are applied throughout the semester. The Chemistry final will cover all the material we cover in this discipline. The quizzes will typically cover one or two chapters. Further details will be provided at the first lecture meeting.

OFFICE HOURS: These will be provided.

DAYS AND TIMES: _____

Students are encouraged to come to the office hours. If the times are not convenient, students should consult with the instructor to set up individual appointments.

STRUCTURE:

TEXTBOOK READING ASSIGNMENTS

They should be completed, whenever possible, before the material is covered in class. These, together with the lecture notes, are the foundation of the course.

HOMEWORK ASSIGNMENTS

Homework assignments will be given in class. To master the material, problem-solving is essential. Much lecture time will be devoted to recitation – where problems will be solved and discussed in detail. Students are encouraged to contribute to class discussions and to participate in solving the in-class problems. Note that class participation can favorably influence your final grade.

ATTENDANCE

Attendance at lectures is required and, as mentioned, class-work counts in your final grade. In addition, it is very difficult to obtain all the necessary knowledge solely from the textbook.

Attendance at the EXAMS and QUIZZES, at the assigned times, is mandatory. Absences must be cleared with the instructor, preferably prior to the tests. Make-up examinations, although very rare, may be given at the discretion of the instructor. However, please note that completing a required task – exam, quiz or assignment, for example - at a time other than the assigned time, may negatively affect a student's final grade.

INCOMPLETES

The grade of Incomplete (IN) will be given to students who are otherwise passing the course and, because of a bona fide reason in the estimation of the instructor, are missing one item, such as a paper, at the end of the semester. Please note that an IN grade is merely an extension of time to complete an item that has not been completed; it is not a way of repeating the course. Moreover, the instructor can take into account the fact that the student had additional time, relative to that allowed to the rest of the class, to complete the assignment.

ACADEMIC INTEGRITY

Appropriate student behavior is expected at all times. Please note that dishonesty will not be tolerated. Please consult the College's Academic Integrity Policy at <http://library.laguardia.edu/files/pdf/academicintegritypolicy.pdf>

SCHEDULE OF LECTURES AND EXAMS

DATE	Subject	Reading Assignment
9/9	Introduction to Physical Sciences. The Scientific Method, Measurements, Systems of Units (Metric and English). Working with Exponentials.	"To the Student", Ch. 1
9/16	Significant Figures as a tool in expressing the Uncertainty in Measurements. Mathematical Operations and Significant Figures.	Ch. 1
9/30,	Motion in One-Dimension. Uniform or Constant Motion as a model. Average velocity. Vectors in one dimension. Accelerated Motion. Free Fall.	Ch. 2
10/7	Vectors in 2 dimensions. Review of the trigonometry of the right triangle. Separating vectors into components and adding vectors by components to obtain a resultant.	Ch. 3, Ch. 4
10/21	Newton's Laws. Conceptual discussion as well as detailed analysis of problems, including those Incorporating 3 rd Law forces like friction.	Ch. 5, Ch.6
10/28	EXAM #1	Chs. 1, 2, 3 & 4
10/28	Newton's Laws. Continue problem-solving	Ch.5, Ch. 6

DATE	Subject	Reading Assignment
11/4	Work and Energy. Kinetic and Potential Energies. Conservative and Nonconservative Systems. Conservation of Energy Principle.	Ch. 7, Ch. 8
11/11	Atomic Theory. Subatomic particles. Atomic Mass. Molecular Mass. The Mole. Molar Mass and Avogadro's #.	Ch. 9
11/18	EXAM #2	Chs. 5, 6, 7 & 8
11/18	Chemical Reactions. How equations represent chemical reactions. Balancing equations by inspection.	Ch. 10
11/25, 12/2	Stoichiometry. Mole and mass calculations from Balanced chemical equations. Limiting reagent.	Ch. 11
12/2, 12/9	Chemical Thermodynamics. Applications of Energy Principles to chemical reactions. Entropy and Free Energy.	Ch. 12 Ch. 13 (as time permits)
12/16	EXAM #3	Chs. 10, 11, 12 & 13 (as appropriate)