SCP101.240 (A & B) – TOPICS IN PHYSICAL SCIENCES
FALL I, 2015

LECTURES :   **Saturdays**   **9:15 – 12:45 pm**   **Room: E216**

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

TEXT: Paul G. Hewitt, <u>Conceptual Physics</u> (Addison- Wesley) 12th Edition, 2014. ISBN: 9780321909107

CATOLOG DESCRIPTION: This course consists of a survey of major concepts in physics and chemistry, and their applications. The physics section includes the theory of motion (kinematics); the law of conservation of energy; different forms of energy, especially electrical and atomic; and the principles of wave motion and optics. Applications to astronomy and geology are also briefly discussed. The unit on chemistry emphasizes the structure of atoms and their combination into molecules. Generally, throughout the course, the fundamental principles are applied to analyze and understand topics ranging from energy conservation and global warming, to photocells and the relationship between structure and function of materials.

COURSE OBJECTIVES:
- To understand how science, and physical science in particular, is accomplished by implementing the scientific method.
- To recognize the central role that measurements play in scientific development and evolution.
- To learn the fundamental laws of nature that help us understand how our world works.
- To appreciate how scientific principles learned can be applied to understand and solve complex problems. For instance, from the observation and understanding of total internal reflection, to its application in optical fibers.

GRADING SYSTEM:

3 Lecture Exams (200 points each)	600 points
Quizzes and Assignments	200 points
Paper	200 points

TOTAL	1000 points

Exams will not be comprehensive, although certain principles and techniques are applied throughout the semester. The quizzes will typically cover one or two chapters. Further details will be provided at the first lecture meeting.

The research paper will be due on Saturday, 11/21. Please note that a student must submit an acceptable paper in order to pass the course. A handout, describing the specific requirements of the paper, will be provided and discussed in detail in class.

HOMEWORK ASSIGNMENTS

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

ATTENDANCE

Attendance at lectures is required and class-participation can marginally count in your final grade. In addition, it is very difficult to obtain all the necessary knowledge solely from the textbook. Indeed, the lectures and class discussions are the key source for the course.

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 the taking of an exam or quiz, 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**

OFFICE HOURS: These will be provided.

DAYS AND TIMES: _____

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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.

SCHEDULE OF LECTURES, LABS AND EXAMS:

DATE	Subject	Reading Assignment
9/12	Introduction to the course; Mathematical Review, Measurement and Unit Conversion	Ch.1 and Appendix A
9/19	Kinematics (Motion) and Vectors in One Dimension	Ch. 3, Appendices B & C
9/26	Newton's 3 Laws of Motion	Ch. 2, 4 & 5
10/3	Work and Energy – Different types, Conservative and Nonconservative Systems, Conservation of Energy, Power	Ch. 7
10/10	EXAM #1	Chs. 1, 2, 3, 4 & 5 and Apps.
10/10	Atomic Theory – Subatomic Particles, Ions, Isotopes	Ch. 11 (selected topics)
10/17	Electrostatics – Charge, Qualitative Description, Coulomb's Law	Ch. 22
10/24	Electricity – Electric Current, Ohm's Law, Electric Power	Ch. 23
10/31	Wave Phenomena – Periodic Waves, Interference The Wave Equation	Ch. 19 (selected topics)
	Light – Introduction, The Electromagnetic Spectrum,	Ch. 26 and 27 (selected topics)
11/7	EXAM #2	Chs. 7, 11, 22 and 23

DATE	Subject	Reading Assignment
11/7, **11/14**	**Light (continues) - Reflection,** **Refraction, Total Internal Reflection**	**Ch. 27,** **Ch. 28**
11/21	**Huygens' Principle, Young's Double-Slit Exp.** **Light Quanta – Blackbody Radiation, Photoelectric** **Effect,**	**Ch. 29** **Ch. 30,**
12/5	**Particle-Wave Duality – deBroglie Wavelength** **Quantum Physics and Review**	**Ch. 31 (selected topics)** **Ch. 32 (selected** **topics)**
12/12	**EXAM #3**	**Chs. 19, 26, 27** **28, 29, 30, 31 and** **32 (as appropriate)**