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**BOROUGH OF MANHATTAN COMMUNITY COLLEGE**

City University of New York

**Department of Science**

**Title of Course: GENERAL PHYSICS THEORY**

**PHY 110**

**Lecture hours 3**
**Lab hours 2**
**Credits 4**

**Course Description**

This course serves as an introduction to general physics theory, especially for students who are not science oriented. A selected number of basic topics in physics are carefully examined and interpreted. Topics include mechanics, heat and thermodynamics, electromagnetism, optics, atomic and nuclear physics. The relevance of the scientist and his/her work to the lives of non-scientists is continually examined.

**Basic skills Prerequisites:**

(MAT 12 or MAT 14 or MAT 41 or MAT 51) and (ENG 88 or ESL 62) and ACR 94

**Required Text & Readings**

Physics of Everyday Phenomena, A Conceptual Introduction to Physics; 8th Edition;
Author: Griffith & Brosing
McGraw-Hill, ISBN-10: 978-1-308-17220-6
ISBN-13: 978-1-308-17220-0

**Laboratory**: Laboratory Handouts for Experiments, distributed in the first lab meeting.

**Other Resources**

Calculator
Ruler (metric) for Lab

**Evaluation & Requirements of Students**

| | |
|---|---|
| Homework/quizzes | 25% |
| Laboratory | 25% |
| Midterm | 25% |
| Final Exam | 25% |
| Total | 100% |

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**Outline of Topics**

***LECTURE***

| WEEK | TOPICS | CHAPTERS |
|---|---|---|
| 1 | Introduction: to Physics<br>Describing Motion | *1,2* |
| 2 | Falling Objects and Projectile Motion | 2,3 |
| 3 | Newton's Laws | 4 |
| 4 | Circular Motion; Law of Universal Gravitation | 5 |
| 5 | Energy and Oscillations (Single Harmonic Motion) | 6 |
| 6 | Momentum and Impulse; Torque | 7,8 (Section 8.2) |
| 7 | Fluids | 9 |
| 8 | Temperature and Heat | 10 |
| 9 | Electrostatics; Simple Circuits | 12,13 |
| 10 | Circuits; Magnetism; Electromagnetism | 13,14 |
| 11 | Wave Motion and Sound; EM Spectrum | 15,16 |
| 12 | Light Waves and Color; Optics | 16,17 |
| 13 | Atomic Structure; Radioactivity | 18 |
| 14 | Nuclear Energy | 18,19 |
| 15 | Review and final exam | |

**College Attendance Policy**
At BMCC, the maximum number of absences is limited to one more hour than the number of hours a class meets in one week. For example, you may be enrolled in a three-hour class. In that class, you would be allowed 4 hours of absence (not 4 days). In the case of excessive absences, the instructor has the option to lower the grade or assign an F or WU grade.

**Academic Adjustments for Students with Disabilities**
Students with disabilities who require reasonable accommodations or academic adjustments for this course must contact the Office of Services for Students with Disabilities. BMCC is committed to providing equal access to all programs and curricula to all students.

**BMCC Policy on Plagiarism and Academic Integrity Statement**
Plagiarism is the presentation of someone else's ideas, words or artistic, scientific, or technical work as one's own creation. Using the idea or work of another is permissible only when the original author is identified. Paraphrasing and summarizing, as well as direct quotations, require citations to the original source. Plagiarism may be intentional or unintentional. Lack of dishonest intent does not necessarily absolve a student of responsibility for plagiarism.

Students who are unsure how and when to provide documentation are advised to consult with their instructors. The library has guides designed to help students to appropriately identify a cited work. The full policy can be found on BMCC's website, www.bmcc.cuny.edu. For further information on integrity and behavior, please consult the college bulletin (also available online).

## Pathways learning outcomes and assessment measurements

| Student Learning Outcomes (Students will be able to…) | Measurements (means of assessment for student learning outcomes listed in first column) |
|---|---|
| 1-Gather, interpret, and assess information from a variety of sources and points of view. | Graded homework assignments on the laws of motion, electromagnetic phenomena, optics, and others will measure how students are able to gather, interpret, and assess information extracted from textbooks, online sources, and online exercises. For example, students can gather from the textbook and online sources the power consumption of all electrodomestic devices in their dream house and assess if the existing power capacity of their current house would be able to handle the resulting load. |
| 2-Evaluate evidence and arguments critically or analytically. | Exams and homework assignments on the topics of mechanics, electromagnetism, optics, and others will measure how students evaluate evidence and arguments presented to them in those assignments, using the physical laws and methods of analysis taught in the course. Problem solving will be a key measure of testing conceptual understanding of basic physical ideas. For example, students can critically determine if a driver was correct in claiming that the car had sufficient distance to break and come to a stop based on the evidence about the car's speed and coefficient of friction between the tires and the road. Using these methods of analysis, students will be able to distinguish between competing hypotheses. |
| 3-Produce well-reasoned written or oral arguments using evidence to support conclusions. | Graded research project on the greenhouse effect, renewable sources of energy, or other topic of current interest and graded assay homework questions like on the effect of atmospheric pressure on the cooking of foods using boiling water, will measure how students produce well-reasoned written arguments using evidence to support conclusions. |

| | |
|---|---|
| 4-Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world. | Students will gain an understanding of basic concepts in physics and will apply these concepts and methods to explain different physical phenomena. For example, students will apply the Newton's Laws of motion to the motion of cars, projectiles, satellites and planets. Students will apply the laws of optics to understand how mirrors, lenses, and optical instruments are able to produce images of objects. Students will apply other physical laws to understand and explain many other physical phenomena observed in their everyday life. Graded homework and exam problems and questions will be the main tool to measure how students identify and apply these fundamental concepts and methods of the physical science to common physical phenomena. Students will also be introduced to the scientific method and will apply it in various hands-on exercises in Lab experiments. |
| 5-Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions. | Students will be required to solve many quantitative problems in exams and homework assignments. To solve these problems, students will have to apply the physical laws learned in the course and use mathematical techniques including calculations and algebraic manipulations. Students will have to critically analyze the quantitative results obtained and assess their validity. For example, students will apply the laws of optics to determine if a refracted ray is generated in the total reflection prisms inside binoculars. |
| 6-Articulate and evaluate the empirical evidence supporting a scientific or formal theory. | Graded essay homework questions in which students need to use empirical evidence collected by scientists in the past and use it to support current scientific theories will be the main tool to measure this learning outcome. For example, empirical evidence on falling objects can be used to support the theory on gravitational forces; empirical evidence providing the kinetic and gravitational potential energies of a falling object can be used to support conservation of energy; empirical evidence from the single and double slit diffraction and interference experiments can be used to support the wave theory of light. Students will have the opportunity to articulate and distinguish between competing theories. In addition, the graded research project on the greenhouse effect, will measure how students produce well-reasoned written arguments using evidence to support their conclusions. |

| | **General Education Learning Outcomes** | **Measurements (means of assessment for general education goals listed in first column)** |
|---|---|---|
| | **Communication Skills-** Students will be able to write, read, listen and speak critically and effectively. | Graded written research project, including a class presentation. |
| | **Quantitative Reasoning-** Students will be able to use quantitative skills and the concepts and methods of mathematics to solve problems. | Graded problems involving calculations in homework and exams. |
| ? | **Scientific Reasoning-** Students will be able to apply the concepts and methods of the natural sciences. | Graded problems and questions in homework and exam. |
| | **Social and Behavioral Sciences-** Students will be able to apply the concepts and methods of the social sciences. | |
| | **Arts & Humanities-** Students will be able to develop knowledge and understanding of the arts and literature through critiques of works of art, music, theatre or literature. | |
| | **Information & Technology Literacy-** Students will be able to collect, evaluate and interpret information and effectively use information technologies. | Graded research project. Students will extract data and assemble it in table and graph format using common software packages like the ones included in Microsoft Office. |
| | **Values-** Students will be able to make informed choices based on an understanding of personal values, human diversity, multicultural awareness and social responsibility. | |