

**INTER AMERICAN UNIVERSITY OF DE PUERTO RICO  
METROPOLITAN CAMPUS  
NATURAL SCIENCES DEPARTMENT**

**SYLLABUS**

**I. GENERAL INFORMATION**

Course Title	: General physics II
Code and Number	: PHYS 3002
Credits	: 4 créditos
Academic Period	:
Professor	: xxxxx xxxxx xxxxxxxxx
Office Hours	:
Office Phone	: (787) 250 1912 Ext. 2323
E-mail	: xxxxxxxx@intermetro.edu

**II. DESCRIPTION**

Continuation of the study of conservation laws, the interaction between particles and fields and the atomic description of matter. Students are exposed to different experiences in the areas of electromagnetism, waves, and modern physics. Emphasis on the integration and application of concepts throughout the experimentation. Requires 45 hours of lecture and 45 hours of lab. Prerequisite: PHYS 3001.

**III. OBJETIVES**

It is expected that at the end of the course, the student can:

1. Examine qualitatively and quantitatively the physical laws under study in the areas of electromagnetism, waves, and modern physics.
2. To relate and integrate the concepts and laws of physics in their interpretation of the physical phenomena of nature.
3. Interpret phenomena of the physical world correctly using the processes of analysis and synthesis.
4. Prepare and interpret graphical representations of physical phenomena.
5. Describe qualitatively any observed physical phenomena.
6. Use mathematics for the quantitative description of physical world.
7. To use Physics in a process of searching for knowledge about the physical world.
8. Applying ethical principles in solving problems in the field of physics.

## **For the Physics Laboratory**

1. Apply the scientific method in an experimental process.
2. Correctly use the techniques of measurement of physical quantities.
3. Relate and apply laboratory experiences to theories and concepts studied in class.
4. Describe qualitatively and quantitatively the different concepts studied in Electromagnetism, Waves and Modern Physics.
5. Apply ethical principles in the Scientific Method in the exercises (Experiments) developed in laboratories.

## **PROFESSIONAL COMPETENCES OF ATTENDEES.**

### **Knowledge**

1. Use mathematical principles and scientific concepts and apply them to new situations.
2. Use the scientific method to understand natural phenomena relevant to living things.

### **Skill**

1. Apply critical thinking and logical reasoning in the solution of problems and in decision making.
2. Use technological means that allow the construction and visualization to select, interpret and analyze scientific information.

### **Attitude**

1. To value the importance of teamwork.
2. Strengthen the ethical aspects within the Natural Sciences.

## **IV. THEMATIC CONTENT**

### **A. General Aspects**

1. Introduction
  - a. Discussion of the Course Syllabus

### **B. Waves**

2. Simple Harmonic Motion (SHM)
3. Sinusoidal Nature of SHM
4. Resonance and Forced Oscillations
5. Wave Motion and types of waves
6. Reflection, Interference and Superposition
7. Standing waves
8. Refraction, Diffraction and traveling wave

## C. Sound

9. Sound intensity: Decibels
10. Vibrating air column
11. Interference: beats
12. Doppler effect
13. Shock Waves and Sonic Boom
14. Applications: Sonar, Ultrasound, etc.

## D. Electricity and Magnetism

15. Static Electricity
16. Coulomb's Law
17. Electric Field and field lines
18. Electric Potential
19. Potential and Electrical Field and equipotential lines
20. Electric Potential of a point charge
21. Capacitors, Dielectrics and stored electric power
22. Electric Current
23. Ohm's Law: Resistors and Resistivity
24. Electric Power
25. Series and Parallel Resistors
26. Electromotive Force
27. Kirchhoff's Rules
28. Series and parallel capacitors and RC circuits
29. Magnets and Magnetic Fields
30. Electric current due to Magnetism
31. Force on an electric current and force on an electric charge
32. Magnetic field due to a current and Ampere's Law
33. Torque on a coil
34. Faraday's Law of Induction, magnetic flux and Lenz's Law
35. Induced Emf on a moving conductor
36. Transformers and Inductance
37. Alternating Current and LR Circuit

## E. Electromagnetic waves and Optics

38. Nature of electromagnetic waves
39. Electromagnetic spectrum, speed of light and ray model
40. Reflection: Images in a Flat Mirror and images in a spherical mirror
41. Index of Refraction and Snell's Law and Total Internal Reflection

- 42. Thin Lenses and Lens Equation
- 43. Wave versus Particle
- 44. The Visible Spectrum, Dispersion and Polarization
- 45. The Human Eye: Corrective Lenses

F. Modern Physics

- 46. Young's Experiment
- 47. Interference in thin films
- 48. Huygens Principle
- 49. Diffraction grating

V. ACTIVIDADES

- A. Lectures.
- B. Simulation and demonstrations in class.
- C. Educative videos related to the class.
- D. Collaborative Works.
- E. Written reports.
- F. Experimentation through laboratory experiences.

VI. EVALUATION

The course evaluation is:

A theoretical part (conference) and an experimental part. The theoretical part is the lecture and is 80% of the course grade. Three partial exams and a comprehensive final exam (all material) are offered. Three forums (15%) and three assignments (15%). The experimental part of the course is the laboratory, which is 20% of the course grade. The comprehensive final exam constitutes the remaining 20% of the course grade. In other words:

A. Class (80%)	Punctuation	Final grade value (%)
First partial exam (Midterm)	100.00 pts	10%
Second partial exam	100.00 pts	10%
Third partial exam.	100.00 pts	10%
Forums	300.00 pts	15%
Assignments	300.00 pts.	15%
Comprehensive Final Exam	100.00 pts	20%
 B. Laboratory (20%)	 100.00 pts	 20%
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<b>Total</b>	<b>1100.00 pts</b>	<b>100%</b>

**Important note:** A final grade of **F** (54 or below) in either part of the course (Lecture or laboratory) means **no-pass** of the course.

The grade scale is:

100-85	A
84-75	B
74-65	C
64-55	D
54 -0	F

## VII. SPECIAL NOTES

### ***Auxiliary services or special needs***

All students who require ancillary services or special assistance must request the same at the beginning of the course or as soon as they acquire knowledge that they need them, through the corresponding registry in the Office of the Professional Counselor, Dr. María de los A. Cabello, located in the University Orientation Program. Extension 2306, or email [mcabello@metro.inter.edu](mailto:mcabello@metro.inter.edu)

### ***Honesty, fraud, plagiarism (General Regulations of Students, Chapter V)***

Lack of honesty, fraud, plagiarism, and any other inappropriate behavior in relation to academic work are major infractions sanctioned by the General Regulations of Students. Major infractions, according to the General Regulations of Students, may result in the suspension of the University for a definite time greater than one year or permanent expulsion from the University, among other sanctions.

### ***Use of electronic devices***

Cell phones and any other electronic device that could disrupt the teaching and learning processes or switch the driving environment to academic excellence were deactivated. The answers are correct, as appropriate. The handling of electronic devices that allow access, storage or sending of data during test evaluations is prohibited.

### ***Compliance with the provisions of Title IX***

The Federal Higher Education Act, as amended, prohibits discrimination based on sex in any academic, educational, extracurricular, athletic or any other program or employment, sponsored or controlled by an institution of higher education regardless of whether it takes place inside or outside the institution's premises, if the institution receives federal funds.

As provided by current federal regulations, a Title IX Assistant Coordinator has been designated in our academic unit to provide, assistance and guidance regarding any alleged incidents of discrimination based on sex or gender, sexual harassment, or sexual assault. You can communicate with the Coordinator Auxiliary, Sr. George Rivera, extension 2262 or 2147, or email [grieverar@metro.inter.edu](mailto:grieverar@metro.inter.edu)

The Document titled **Rules and Procedures for Addressing Alleged Violations of the Provisions of Title IX** contains the institutional rules to channel any complaint filed based on this type of claim. This document is available on the website of the Inter American University of Puerto Rico ([www.inter.edu](http://www.inter.edu)).

## VIII. EDUCATIONAL RESOURCES

### A. Textbook

Cutnell & Johnson. (2018). PHYSICS. Eleventh Edition. United Staed of America. Wiley ISBN # 13: 978-1-119-39187-6 or Volume 2: 9781119460176. [www.wiley.com](http://www.wiley.com)

## IX. BIBLIOGRAPHY

### A. Texts

- Giancoli, Douglas C. (2014). *Física: principios con aplicaciones*. Séptima Edición. México. Pearson Prentice Hall ISBN # 13: 978-0-321-62592-2 o 10: 0-0321-62592-7. [www.pearsonhighered.com](http://www.pearsonhighered.com)
- Cutnell, John, and Jonson, Kenneth. (2012). *Physics 9e*, ninth edition. Volume two. USA. John Wiley & Sonc, Inc. USA. ISBN 978-0-470-879542. [www.wiley.com/college/cutnell](http://www.wiley.com/college/cutnell)
- Cutnell, John. And Jonson, Kenneth. (2009). *Physics 8e*. eight Edition. Volume two. USA. John Wiley & Sonc, Inc. NJ, USA. ISBN 978-0-470-37925-7. [www.wiley.com/college/cutnell](http://www.wiley.com/college/cutnell)
- Cutnell, John. And Jonson, Kenneth. (2007). *Physics*. Seven Edition. Volume two. John Wiley & Sonc, Inc. NJ, USA.
- Cutnell, John. And Jonson, Kenneth. (2006). *Essential of physics*. Sixth Edition. John Wiley & Sonc, Inc. NJ, USA.
- Cutnell, John. And Jonson, Kenneth. (2004). *Physics*. Sixth Edition. John Wiley & Sonc, Inc. NJ, USA.
- Gettys, Keller and Skove. (2005). *Física para Ciencias e Ingeniería*. Tomo 2. Segunda Edición. Mc Graw-Hill. México.
- Giambattista, Alan. McCarthy, Betty and Richardson, Robert. (2008). *Physics*. Mc Graw-Hill, Higher Education. New York. Contains samples examination questions MCAT (Medical College Admisión Test). ISBN: 978-0-07-340447-9.
- Giancoli, Douglas. (1998) *Physics*, Fifth Edition, Pearson Prentice Hall. New jersey. ISBN # 0-13-611971-9
- Hecht, Eugene. (2003). *Physics: Algebra/Trig*. Third Edition. Thomson: Brooks/cole. California, USA. WEB: <http://www.thomsonrights.com>
- Jones, Edwin. y Childrers, Richard. (2001). *Física Contemporánea*. Tercera Edición. McGraw-Hill. México.
- Kirkpatrick, Larry, D. and Francis, Gregory, E. (2007). *Physics, a World view*. Sixth Edition. Thomson Brooks/Cole, a part of the Thomson Corporation. United States of America. ISBN: 0-495-01088-X.
- Moore, Thomas, A. (2005) *Física: Seis ideas fundamentales*. Tomo II, Segunda edición. Mc Graw Hill. México.
- Ostdiek, Vern. J and Bord, Donald J. (2005). *Inquiry into Physics*. Fifth Edition.

Brooks/Cole, a division of Thomson Learning. United States of America. ISBN: 0-534-49168-5.

- Serway, Raymond. And Jewett, John, jr. (2008) *Physics for Scientists and Engineers with Modern Physics*. Seventh Edition. Thomson Learning, Inc. United States. ISBN-13: 978-0-495-11245-7 or 10: 0-495-11245-3.
- Serway, Raymond. and Faughn, Jerry, S. (2003). *College Physics*. Sixth Edition. Thomson: Brooks/cole. California, USA. WEB: <http://www.thomsonrights.com>
- Serway, Raymond, A and Vuille, Chris. (2007). *Essentials of College Physics*. Thomson, Brooks/Cole. USA.
- Tippens, Paul, E. (2001). *Física: conceptos y aplicaciones*. Sexta Edición. McGraw-Hill. México.
- Wilson, Jerry, D. and Buffa, Anthony, J. (2003) *College Physics*. Fifth Edition. Pearson Prentice Hall. New Jersey.
- Walker, James, S. (2004) *Physics*. Second Edition. Pearson Prentice Hall. New Jersey.
- Young and Freedman (2008). *Sear and Zeemansky's: University Physics with Modern Physics*. 12 Edition. Pearson Addison-Wesley. San Francisco. ISBN-10: 0-321-50121-7.
- Zitzewitz, Paul, W. and Neff, Robert, F. (2003). *Física 2*. Segunda Edición. Mc Graw-Hill. México.
- Zitzewitz, Paul, W. (2002). *Gencoe Physics, principles and problems*. Mc Graw-Hill. USA.

## B. Audiovisual Resources

The following resources are available in the Audiovisual Room of our Campus to help to study. The following are videos in DVD format.

<b>AV QC 225.15 C65 2007</b>	The Color of Sound
<b>AV QC 363.V8518 2007</b>	Usando la luz
<b>AV QC 363.N3818 2007</b>	La Naturaleza de la Luz
<b>AV QC 28.W394 2000</b>	Wave: Energy in Motion
<b>AV QC 28.L564 2000</b>	Light, Lenses, and Lasers
<b>AV QC 28.E543 2000</b>	Electricity: The Invisible River of Energy
<b>AV QD 39.2.C658 2000</b>	Compounds: Electromagnetic Attraction in Molecules

## C. Supplemental Readings

In the Reserve Room (Access to Information Center) of our Campus, the following resources are available to help you study.

<b>QC23 .G3918 1994</b>	1994
Física : principios con aplicaciones	1a ed. en español.
Giancoli, Douglas C.	
<b>QC23 .G399 1995</b>	1995
Physics : principles with applications	4th ed.
Giancoli, Douglas C.	
<b>QC23 .G5218 1997</b>	1997
Física : principios con aplicaciones	4a ed.
Giancoli, Douglas C.	
<b>QC23 .G399 1998</b>	1998
Physics : principles with applications	5th ed.
Giancoli, Douglas C.	

#### **D. Electronic Resources**

On the WEB you can use the following information.

<http://www.metro.inter.edu> WEB of the Inter American University of Puerto Rico, Metropolitan Campus.

<http://metro.inter.edu/servacad/cai/index.html> This is the library WEB (Access to Information Center)

Useful links to reinforce the Physics class.

<http://www.khanacademy.org> o en español <http://www.es.khanacademy.org>

<http://www.physicsclassroom.com>

The following addresses are tools to navigate or search for information on the Internet.

<http://www.yahoo.com>

<http://www.google.com.pr/>

<http://www.hotmail.com>