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

SYLLABUS

I. GENERAL INFORMATION

Course Title	: General physics I
Code and Number	: PHYS 3001
Credits	: 4 créditos
Academic Period	:
Professor	:
Office Hours	:
Office Phone	: (787) 250 1912 Ext. 2323
E-mail	: xxxxxxxx@intermetro.edu

II. DESCRIPTION

Logical and unified presentation of physics at the introductory level, emphasizing the basic ideas constituting its foundations: Laws of motion and the conservation and interaction between particles and fields. Students are exposed to different experiences in the fields of mechanics and heat in the teaching-learning process. Emphasis on the integration and application of concepts throughout the experimentation. Requires 45 hours of lecture and 45 hours of lab. Prerequisite MATH 1500.

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. Review of Mathematical Concepts

2. The Nature of Physics
3. Units, conversion of units and dimensional Analysis
4. Basic concepts of trigonometry, algebra, and geometry
5. Scalar and Vectors, Definition, Addition and Subtraction
6. Addition of Vectors by Means of Components

C. Kinematics in one and Two Dimension

7. Displacement, Speed, Velocity and Acceleration
8. Kinematics for Constant Acceleration
9. Freely Falling Bodies
10. Graphical Analysis
11. Kinematics in Two Dimensions
12. Projectile Motion
13. Relative Velocity

D. Newton's Laws of Motion

14. Force and Mass
15. Newton's Law: First, second and Third
16. Types of Forces: Gravitational, Normal and Tension
17. Static and Kinetic Frictional Forces
18. Equilibrium and Nonequilibrium Application of Newton's Laws

E. Uniform Circular Motion and Gravity

19. Definition of Uniform Circular Motion
20. Centripetal Acceleration and Force
21. Banked Curves and Satellites in Circular Orbits
22. Apparent Weightlessness and Artificial Gravity
23. Vertical Circular Motion

F. Work and Energy, Impulse and Momentum

24. Definition of Work Done by a Constant Force
25. The Work-Energy Theorem and Kinetic Energy
26. Gravitational Potential Energy
27. Conservative versus Nonconservative Forces
28. The Conservation of Mechanical Energy
29. Nonconservative Forces and the Work-Energy Theorem and Power
30. The Impulse-Momentum Theorem
31. The Conservation of Linear Momentum
32. Collision in one and Two Dimensions and Center of Mass

G. Rotational Kinematics and Dynamics

33. Angular Displacement, Velocity and Acceleration
34. The Equation of Rotational Kinematics
35. Angular and Tangential Variables
36. Centripetal and Tangential Acceleration and Rolling Motion
37. Torque on Rigid Objects and Center of Gravity
38. Newton's Second Law for Rotational Motion

39. Rotational Work, Energy and Angular Momentum

H. Simple Harmonic Motion and Elasticity

40. Simple Harmonic Motion and the Reference Circle
41. Energy and SHM (Simple Harmonic Motion) and The Pendulum
42. Damped and Driven Harmonic Motion and Resonance
43. Elastic Deformation and Hooke's Law: Stress and Strain

I. Mechanic of Fluids

44. Mass Density and Pressure
45. Static Fluid and Pressure Gauges
46. Pascal's and Archimedes' Principle
47. Fluid in Motion and Viscous Flow
48. The Equation of Continuity and Bernoulli's Equation

J. Heat

49. Temperature, Scales and Thermometer
50. Linear and Volume Thermal Expansion
51. Heat and Internal Energy
52. Specific Heat Capacity, Latent Heat and Humidity
53. Transfer of Heat: Convection, Conduction and Radiation

V. ACTIVITIES

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%
Total	**1100.00 pts**	**100%**

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

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 griverar@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).

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 1: 9781119460190. 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
- ✓ Cutnell, John, and Jonson, Kenneth. (2012). *Physics 9e*. ninth Edition. Volume one. USA. John Wiley & Sonc, Inc. USA. ISBN 978-0-470-879535. www.wiley.com/college/cutnell
- ✓ Cutnell, John and Jonson, Kenneth. (2009). *Physics 8e*. eight Edition. Volume one. USA. John Wiley & Sonc, Inc. NJ, USA. ISBN 978-0-470-37924-0. www.wiley.com/college/cutnell

- ✓ Cutnell, John and Jonson, Kenneth. (2007). *Physics*. Seven Edition. Volume one. 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 1. 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 C. (2006). *Física: principios con aplicaciones*. Sexta Edición. México. Pearson Prentice Hall ISBN # 970-26-0695-0. http://www.prenhall.com/giancoli/
- ✓ Giancoli, Douglas. (1998) *Physics*, Fifth Edition, Pearson Prentice Hall. New jersey. IBSN # 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 I, 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 Addision-Wesley. San Francisco. ISBN-10: 0-321-50121-7.
- ✓ Zitzewitz, Paul, W. and Neff, Robert, F. (2003). *Física 1.* 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.

AV Q 175.S35 1960	El Método Científico en Acción
AV QC 39.M4318 2007	Midiendo Longitud y Temperatura
AV QB 46.G3218 1969A	Galileo: El desafío a la Razón
AV QC 28.M678 2000	Motion: Newton's Three Laws
AV QC 28.F673 2000	Force and Work: Energy in Action
AV QC 28.H437 2000	Heat and the Changing States of Matter
AV QB 806.B5	Birth and Death of a Star

C. Supplemental Readings

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

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

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