

DEPARTAMENTO DE FISICA  
**Recinto Universitario de Mayagüez**  
 Universidad de Puerto Rico  
 Syllabus for the Course:  
**FISI-3171**  
 Second Sem. 2016-17

Text: *Physics for Scientists & Engineers*  
*Douglas C. Giancoli / Fourth Edition*

- 1-There will be 4 partial exams and 1 final exam.
- 2-Profesor will explain the way to compute the final grade of the course.
- 3-Assistance to classes is obliged. Assistance will affect the final grade.
- 4-Last day for partial withdraw is Thursday the 22th of April.
- 5-Pre-requisit for the course: MATE-3031.

Profesor:	Office:
Office hours:	

**NOTE TO STUDENTS:**

In the syllabus there are 60 lessons for the whole semester. Titles of the chapter are undermarked. Some sections of each chapter are shown too. All the sections that student must study are given for every lesson (independently that the professor could discuss them all at class).

Questions (Q) and problems (P) of Giancoli's book are given and they must be done by students as part of their individual preparation. They represent a convenient training for students in order to get C in the course. Those who wish to get an A as final result probably will require to solve more problems (from section of "General Problems" at the end of each chapter).

Chapters for each Partial Exam are written in the Syllabus, as well as the date for each exam. These dates are chosen under interdepartmental agreement in order to avoid overlapping of exams and classrooms for different disciplines. These dates cannot be moved to avoid conflicts.

In the next table, weeks are differentiated at the first column, one week in white fond and the next one in gray. Rows with XXXX represent weeks with Partial Exams (four in the whole semester).

Lección	Temas	Secciones	Preguntas (Q)	Problemas (P)
1 T Jan 17	<u>Introduction</u> . Models, theories, laws. Measurements. Significant figures.	1(1-3)	2, 4, 6, 7, 8	2, 3, 4, 6, 7, 8
2 W Jan 18	SI Units. Conversions. Order of magnitude. Dimensional analysis.	1(4-7)		11, 16, 18, 19, 24, 27, 36, 37
3 F Jan 20	<u>Kinematics in One Dimension</u> . Reference frames, displacement, velocity, acceleration	2(1-4)	1, 2, 3, 4, 5, 6, 7, 8, 9, 10	1, 3, 5, 6, 8, 9, 11, 15, 17, 18, 21, 22, 23, 25, 27, 29
4 M Jan 23	Motion at constant acceleration. Freely falling objects. Problems.	2(5-7)	11, 12, 13, 14, 15, 16, 17	31, 33, 35, 37, 41, 43, 48, 49, 51, 55, 57, 61, 63
5 T Jan 24	Graphical analysis. Problems of Chap. 2.	2(1-9)	18, 19	82, 93
6 W Jan 25	<u>Kinematics in Two Dimensions</u> . Vectors and its basic operations.	3(1-5)	1, 6, 7, 8, 9	1, 3, 4, 5, 7, 9, 11, 13, 15
7 F Jan 27	Vector kinematics. Time derivative of vectors. Problems.	3(6)	2, 3, 4, 5, 10, 11	17, 19, 21, 23, 25
8 M Jan 30	Projectile motion. Problems.	3(7-8)	12, 13, 14, 15, 16, 17	29, 31, 33, 35, 37, 41, 45, 46, 51
9 T Jan 31	Relative velocity. Problems.	3(9)	18, 19, 20, 21	57, 58, 61, 63, 67, 69
10 W Feb 1	<u>Dynamics in rectilinear motions</u> . Forces. Mass. Newton's laws	4(1-5)	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	1, 3, 4, 5, 7, 9, 10, 13, 17
11 F Feb 3	Weight, normal, stress. Free body diagram. Problems.	4(6-8)	14, 15, 16, 17, 18, 19, 20, 21, 22, 23	21, 23, 27, 29, 33
12 M Feb 6	Problems with forces. Two and three bodies systems (pulley, inclines)	4(1-8)	24	35, 37, 40, 45, 46, 48, 49, 51, 54, 57
13 T Feb 7	<b>EXAM 1</b> (Caps. 1, 2, 3) (Date for multisectional exams)	XXXX	XXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXX
14 W Feb 8	Friction. Problems with friction.	5(1)	1, 2, 3, 4, 5, 6, 7, 8	1, 3, 5, 7, 9, 11, 13, 17, 19, 23, 28, 31
15 F Feb 10	<u>Dynamics in curvilinear motions</u> . Circular motions: tangential and normal accelerations; centripetal force	5(2-3)	10, 11, 12, 13, 14, 15, 16	60, 61, 62, 34, 35, 37

16 M Feb 13	Problems with centripetal force.	5(4-5)	17, 18, 19, 20, 21, 22	39, 40, 41, 43, 45, 47, 51, 53, 55, 59
17 T Feb 14	Velocity dependent forces. Problems.			
18 W Feb 15	<u>Gravitation</u> . Universal gravitation. Gravity near the Earth's surface. Satellites. ( <i>Monday day</i> )	6(1,3,4)	1, 2, 3, 4, 5, 6, 7, 8, 9, 10	1, 3, 5, 7, 9, 11, 15, 23, 25, 27
19 F Feb 17	Kepler's laws. Gravitational field. Types of forces in nature. Problems.	6(5-7)	12, 13, 14, 16, 23	37, 39, 48, 49
M Feb 20	<u>HOLIDAY</u>			
20 T Feb 21	<u>Work and energy</u> . Work done by a constant force. Scalar product. Problems. ( <b>AS A MONDAY</b> )	7(1-2)	1, 2, 3, 4, 5, 6, 7, 8, 9, 10	1, 3, 7, 9, 11, 16, 17, 18, 21, 22, 25
21 W Feb 22	Work done by varying force. Kinetic energy. Work and energy. Problems.	7(3-4)	11, 12, 13, 14, 15	34, 35, 40, 41, 47, 51, 53, 55, 57, 61, 63, 65
22 F Feb 24	<u>Conservation of energy</u> . Conservative and nonconservative forces. Potential energies: gravitatory and elastic forms.	8(1-2)	1, 2, 3, 4, 5, 6	1, 3, 5, 8, 9
23 M Feb 27	Mechanical energy and its conservation. Problems.	8(3-4)	7, 8, 9, 10, 11, 13, 15, 17	11, 13, 15, 16, 20, 21, 22, 25
24 T Feb 28	<b>EXAM 2</b> (Caps. 4, 5, 6, 7, 8) (Date for multisectional exams)	XXXX	XXXXXXXXXX	XXXXXXXXXXXXXXXXXX
25 W Mar 1	General law of energy conservation. Power. Problems.	8(5-6, 8)	18, 19, 20, 22, 23, 24, 25	29, 31, 33, 36, 37, 62, 63, 65, 67
26 F Mar 3	Gravitational potential energy and escape velocity. Potential energy diagrams. Problems.	8(6-7)	14, 16, 26, 27, 28	45, 47, 49, 53, 57, 75, 77, 85, 87
27 M Mar 6	<u>Linear momentum</u> . Momentum and force. Momentum conservation. Collisions and impulse.	9(1-3)	1, 2, 3, 4, 5, 6, 7, 8, 9, 10	1, 3, 6, 9, 11, 13, 16, 23, 25, 28
28 T Mar 7	Elastic collisions in one dimension. Inelastic collisions. Problems.	9(4-6)	11, 12, 13, 14, 15, 16, 17,	35, 37, 42, 45, 50, 51
29 W Mar 8	Collisions in two dimensions. Problems.	9(7)	18, 19, 20, 21	55, 56
30 F Mar 10	Center of mass and its motion. Problems.	9(8-9)	22, 23, 24, 25, 26, 27, 28, 29, 30	62, 63, 64, 65, 72, 74, 75, 77
31 M Mar 13	<u>Rotational motion</u> . Kinematic angular quantities. Rotational motion with constant angular acceleration.	10(1-3)	1, 2, 3, 15	1, 3, 5, 7, 9, 15, 17, 19, 23
32 T Mar 14	Torque. Rotational dynamics. Moment of inertia. Problems.	10(4-6)	4, 5, 7, 8, 9, 11	24, 25, 27, 29, 30, 31, 33, 35, 37, 41, 47, 51
33 W Mar 15	Determining moments of inertia. Rotational kinetic energy. Problems.	10(7-8)	13, 14	55, 56, 59, 63, 65, 67
34 F Mar 17	Rolling motion. Problems. Problems of Chap. 10.	10(9) 10(1-9)	10, 12,	70, 71, 73, 75
35 M Mar 20	<u>Angular Momentum</u> . Axial angular momentum for a solid. Vector product and torque.	11(1-2)	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 3, 5, 7, 11, 23, 27
36 T Mar 21	Angular momentum for a particle and a system of particles. Angular momentum for a solid	11(3-5)	13, 14	32, 33, 35, 37, 39, 41
W Mar 22	<u>HOLIDAY</u>			
37 F Mar 24	Conservation of angular momentum. Problems. (Inertial forces).	11(6, 8)	15, 16, 17, 18,	47, 48, 49, 50, (58)
38 M Mar 27	<u>Static Equilibrium</u> . Conditions for equilibrium. Problema. Equilibrium types	12(1-3)	1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 15	1, 3, 5, 7, 11, 13, 15, 21
39 T Mar 28	<u>Fluids</u> . Phases of matter. Density. Pressure. Atmospheric and gauge pressures. Pascal.	13(1-6)	1, 2, 3, 4, 5, 6	3, 5, 7, 8, 9, 13, 17, 21
40 W Mar 29	Archimedes' Principle. Bouyance anf pressure problems.	13(7)	7, 8, 9, 10, 11, 12, 13, 14, 15, 16	27, 29, 31, 35, 37
41 F Mar 31	Ideal fluids in motion. Continuity and Bernoulli equations. Problems.	13(8-10)	17, 18, 19, 20, 21, 22	43, 45, 47, 53, 55, 59
42 M Apr 3	<u>Oscillations</u> . Spring-body system. Simple harmonic motion. Oscillator energy. Problems.	14(1-3)	1, 2, 3, 4, 5, 6, 9, 11, 12	1, 3, 5, 7, 11, 13, 15, 17, 25, 27, 35, 37
43 T Apr 4	<b>EXAM 3</b> (Caps. 9, 10, 11, 12) (Date for multisectional exams)	XXXX	XXXXXXXXXX	XXXXXXXXXXXXXXXXXX
44 W Apr 5	Relation with circular motion. Pendulums. Problems.	14(4-6)	7, 10, 13, 14, 15	41, 43, 45, 52, 53
45 F Apr 7	Damped oscillations. Forced oscillations. Resonance. Problemas of Chap. 14.	14(7-8) 14(1-8)	16, 18, 19	63, 65
Apr 10- Apr 16	<u>HOLY WEEK</u>			
46 M Apr 17	<u>Wave motion</u> . Waves: characteristics, types. Energy. Problems.	15(1-3)	1, 2, 3, 4, 5, 7, 9	1, 3, 5, 7, 9, 15, 17
47 T Apr 18	Mathematical representation of a traveling wave. Wave equation. Superposition principle. Problems.	15(4-6)	10	22, 25, 26, 31
48 W Apr 19	Reflection and transmission. Interference. Standing waves. Problems.	15(7-9)	11, 12, 13, 14, 15, 16	37, 41, 43, 45, 47, 49, 51, 52, 54
49 Th Apr 20	<u>Sound</u> . Characteristics. Waves of pressure. Decibels. Strings and air columns. Problems ( <b>AS A FRIDAY</b> )	16(1-4)	1, 2, 3, 4, 5, 6, 7, 8, 9, 11	1, 3, 7, 13, 14, 15, 16, 19, 33, 35, 39
50 M Apr 24	Interference of sound waves. Doppler effect. Problemas.	16(6-7)	13, 15, 17, 18, 19	53, 55, 61, 63
51 T Apr 25	<u>Temperature</u> . Atomic-molecular theory of matter. Temperature and thermometric scales. Zeroth Law. Thermal expansion. Prob.	17(1-4)	1, 2, 3, 4, 5, 6, 7, 9, 12, 15, 16	1, 3, 5, 7, 9, 11, 15
52 W Apr 26	Gas law and absolute temperature. Ideal gas. Avogadro's number. Problems	17(6-9)		29, 31, 33, 37, 41, 45
53 F Apr 29	<u>Kinetics theory of gases</u> . "Micro" interpretation of "temperature". Velocity distribution. Problems.	18(1-2)	1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13	1, 2, 5, 7

54 M May 1	<b>EXAM 4</b> (Caps. 13, 14, 15, 16) (Fecha de examen multiseccional)	XXXX	XXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXX
55 T May 2	<u>Heat</u> . Heat as energy transfer. Internal energy. Specif. Heat. Calorimeter	19(1-4)	1, 2, 3, 4, 5, 6	1, 3, 5, 7, 9, 15, 17
56 W May 3	Phase changes. Latent heat. Problems	19(4-5)	7, 8, 9, 10	19, 21, 22, 24
57 F May 5	First law of thermodynamics. Cuasi-static processes for a gas and work in those processes. Problems.	19(6-7)	11, 12, 13, 14, 15, 16, 17, 18, 19	27, 29, 31, 33, 35
58 M May 8	Molar specific heat. Adiabatic expansion of an ideal gas. Problems of Chap.19	19(8-9) 19(1-9)	20, 21	43, 45, 51, 53
59 T May 9	<u>Second law of thermodynamics</u> . Reversible and irreversible processes. Heat engines. Carnot's cycle. Efficiency.	20(1-3)	1, 2, 3, 4, 5, 6, 7	1, 3, 6, 8, 9, 15, 17
60 W May 10	Entropy and the second law of thermodynamics. Problems for ideal cycles.	20(5-6)	9, 10 11, 13, 14, 15, 16	32, 33, 35, 43, 45

**FINAL EXAM.**

**Martes, 17 ene-Comienzan las clases**

**Lunes, 20 febrero-Feriado-Día de los Presidentes y de los Próceres Puertorriqueños**

**Martes, 21 febrero- clases de lunes**

**Miércoles, 22 marzo-Feriado-Día de la Abolición de la Esclavitud**

**Lunes, 10 al sábado, 15 abril-Receso Académico de Semana Santa**

**Miércoles, 19 abril-Ultimo día para bajas parciales**

**Jueves, 20 abril-clases de viernes**

**Viernes, 21 al sábado, 22 abril-Receso Acad.-Justas Interuniversitarias (Tentativo)**

**Jueves, 4 mayo-Ultimo día exámenes parciales**

**Jueves, 11 mayo-Ultimo día de clases**

**Viernes, 12 mayo-Periodo de Repaso**

**Sábado, 13 al Sábado, 20 mayo-Exámenes finales**

**Lunes, 22 mayo-Entrega de notas hasta la 1:00 p.m.**