

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 T Jan 17	SI Units. Conversions. Order of magnitude. Dimensional analysis.	1(4-7)		11, 16, 18, 19, 24, 27, 36, 37
3 Th Jan 19	<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 Th Jan 19	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 T Jan 24	<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 Th Jan 26	Vector kinematics. Time derivative of vectors. Problems.	3(6)	2, 3, 4, 5, 10, 11	17, 19, 21, 23, 25
8 Th Jan 26	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 T Jan 31	<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 Th Feb 2	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 Th Feb 2	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	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
14 T Feb 7	EXAM 1 (Caps. 1, 2, 3) (Date for multisectional exams)	XXXX	XXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXX

15 Th Feb 9	<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 Th Feb 9	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 T Feb 14	<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 Th Feb 16	Kepler's laws. Gravitational field. Types of forces in nature. Problems.	6(5-7)	12, 13, 14, 16, 23	37, 39, 48, 49
20 Th Feb 16	<u>Work and energy.</u> Work done by a constant force. Scalar product. Problems. (<i>Tuesday day</i>)	7(1-2)	1, 2, 3, 4, 5, 6, 7, 8, 9, 10	1, 3, 7, 9, 11, 16, 17, 18, 21, 22, 25
T Feb 21	<u>AS A MONDAY</u>			
21 Th Feb 23	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 Th Feb 23	<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 T Feb 28	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	EXAM 2 (Caps. 4, 5, 6, 7, 8) (Date for multisectional exams)	XXXX	XXXXXXXXXX	XXXXXXXXXXXXXXXXXX
25 Th Mar 2	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 Th Mar 2	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 T Mar 7	<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 Th Mar 9	Collisions in two dimensions. Problems.	9(7)	18, 19, 20, 21	55, 56
30 Th Mar 9	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 T Mar 14	<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 Th Mar 16	Determining moments of inertia. Rotational kinetic energy. Problems.	10(7-8)	13, 14	55, 56, 59, 63, 65, 67
34 Th Mar 16	Rolling motion. Problems. Problems of Chap. 10.	10(9) 10(1-9)	10, 12,	70, 71, 73, 75
35 T Mar 21	<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
37 Th Mar 23	Conservation of angular momentum. Problems. (Inertial forces).	11(6, 8)	15, 16, 17, 18,	47, 48, 49, 50, (58)
38 Th Mar 23	<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 T Mar 28	Archimedes' Principle. Bouyance anf pressure problems.	13(7)	7, 8, 9, 10, 11, 12, 13, 14, 15, 16	27, 29, 31, 35, 37
41 Th Mar 30	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 Th Mar 30	<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	Relation with circular motion. Pendulums. Problems.	14(4-6)	7, 10, 13, 14, 15	41, 43, 45, 52, 53
44 T Apr 4	EXAM 3 (Caps. 9, 10, 11, 12) (Date for multisectional exams)	XXXX	XXXXXXXXXX	XXXXXXXXXXXXXXXXXX
45 Th Apr 6	Damped oscillations. Forced oscillations. Resonance. Problemas of Chap. 14.	14(7-8) 14(1-8)	16, 18, 19	63, 65
46 Th Apr 6	<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
Apr 10- Apr 16	<u>HOLY WEEK</u>			
47 T Apr 18	Mathematical representation of a traveling wave. Wave equation. Superposition principle. Problems.	15(4-6)	10	22, 25, 26, 31
48 T Apr 18	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
Th Apr 20	<u>AS A FRIDAY</u>		(Justas Deportivas on Friday)	
49 T Apr 25	<u>Sound.</u> Characteristics. Waves of pressure. Decibels. Strings and air columns. Problems	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 T Apr 25	Interference of sound waves. Doppler effect. Problemas.	16(6-7)	13, 15, 17, 18, 19	53, 55, 61, 63
51 Th Apr 27	<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 Th Apr 27	Gas law and absolute temperature. Ideal gas. Avogadro's number. Problems	17(6-9)		29, 31, 33, 37, 41, 45

53 M May 1	EXAM 4 (Caps. 13, 14, 15, 16) (Fecha de examen multiseccional)	XXXX	XXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXX
54 T May 2	<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
55 Th May 4	<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 Th May 4	Phase changes. Latent heat. Problems	19(4-5)	7, 8, 9, 10	19, 21, 22, 24
57 T May 9	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 T May 9	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 Th May 11	<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 Th May 11	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.