

DEPARTAMENTO DE FISICA
Recinto Universitario de Mayagüez
 Universidad de Puerto Rico
 Syllabus for the Course:
FISI-3171
 First Sem. 2011-12

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 16th 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 content 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. Gray rows represent day without classes. Rows with XXXX represent weeks with Partial Exams (four in the whole semester).

Lección	Temas	Secciones	Preguntas (Q)	Problemas (P)
1 Tu Ene 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 Ene 18	SI Units. Conversions. Order of magnitude. Dimensional analysis.	1(4-7)		11, 16, 18, 19, 24, 27, 36, 37
3 F Ene 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 Ene 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 Tu Ene 24	Graphical analysis. Problems of Chap. 2.	2(1-9)	18, 19	82, 93
6 W Ene 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 Ene 27	Vector kinematics. Time derivative of vectors. Problems.	3(6)	2, 3, 4, 5, 10, 11	17, 19, 21, 23, 25
8 M Ene 30	Projectile motion. Problems.	3(7-8)	12, 13, 14, 15, 16, 17	29, 31, 33, 35, 37, 41, 45, 46, 51
9 Tu Ene 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 Tu 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 W Feb 8	EXAM 1 (Caps. 1, 2, 3) (Date for multisectional exams)	XXXX	XXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXX
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 Tu Feb 14	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
18 W Feb 15	<u>Gravitation.</u> Universal gravitation. Gravity near the Earth's surface. Satellites.	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
Mon 20	Hollyday (G. Washington)			
20 Tu Feb 21	<u>Work and energy.</u> Work done by a constant force. Scalar product. Problems.	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 noncon- servative 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 Tu Feb 28	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
25 W Feb 29	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
26 F Mar 2	<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
27 M Mar 5	EXAM 2 (Caps. 4, 5, 6, 7, 8) (Date for multisectional exams)		XXXX	XXXXXXXXXX
28 T Mar 6	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 7	Collisions in two dimensions. Problems.	9(7)	18, 19, 20, 21	55, 56
30 F 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 M Mar 12	<u>Rotational motion.</u> Kinematic angular quantities. Ro- tational motion with constant angular acceleration.	10(1-3)	1, 2, 3, 15	1, 3, 5, 7, 9, 15, 17, 19, 23
32 Tu Mar 13	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 14	Determining moments of inertia. Rotational kinetic energy. Problems.	10(7-8)	13, 14	55, 56, 59, 63, 65, 67
34 F Mar 16	Rolling motion. Problems. Problems of Chap. 10.	10(9) 10(1-9)	10, 12,	70, 71, 73, 75
35 M Mar 19	<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 Tu Mar 20	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

Wed 21	As Thursday (Hollyday)			
37 F Mar 23	Conservation of angular momentum. Problems. (Inertial forces).	11(6, 8)	15, 16, 17, 18,	47, 48, 49, 50, (58)
38 M Mar 26	<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 Tu Mar 27	<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 28	EXAM 3 (Caps. 9, 10, 11, 12) (Date for multisectional exams)	XXXX	XXXXXXXXXX	XXXXXXXXXXXXXXXXXX
41 F Mar 30	Archimedes' Principle. Bouyance anf pressure problems..	13(7)	7, 8, 9, 10, 11, 12, 13, 14, 15, 16	27, 29, 31, 35, 37
Abr 1-6	HOLLYWEEK			
42 M Abr 9	Ideal fluids in motion. Continuity and Bernoulli equations. Problems.	13(8-10)	17, 18, 19, 20, 21, 22	43, 45, 47, 53, 55, 59
43 Tu Abr 10	<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
44 W Abr 11	Relation with circular motion. Pendulums. Problems.	14(4-6)	7, 10, 13, 14, 15	41, 43, 45, 52, 53
45 Th Abr 12	Damped oscillations. Forced oscillations. Resonance. Problems of Chap. 14. (As Monday)	14(7-8) 14(1-8)	16, 18, 19	63, 65
F 13	Universitary Games			
M 16	Hollyday (de Diego)			
46 Tu Abr 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 W Abr 18	Mathematical representation of a traveling wave. Wave equation. Superposition principle. Problems.	15(4-6)	10	22, 25, 26, 31
48 F Abr 20	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 M Abr 23	<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 Tu Abr 24	Interference of sound waves. Doppler effect. Problemas.	16(6-7)	13, 15, 17, 18, 19	53, 55, 61, 63
51 W Abr 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 F Abr 27	Gas law and absolute temperature. Ideal gas. Avogadro's number. Problems	17(6-9)		29, 31, 33, 37, 41, 45
53 M Abr 30	<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 Tu May 1	<u>Heat</u> . Heat as energy transfer. Internal energy. Specif. Heat. Calorimetry	19(1-4)	1, 2, 3, 4, 5, 6	1, 3, 5, 7, 9, 15, 17
55 W May 2	EXAM 4 (Caps. 13, 14, 15, 16) (Date for multisectional exams)	XXXX	XXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXX
56 F May 4	Phase changes. Latent heat. Problems	19(4-5)	7, 8, 9, 10	19, 21, 22, 24
57 M May 7	<u>First law of thermodynamics</u> . Cuasiestatic 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 Tu 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 W 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 F 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

DEPARTMENTAL FINAL EXAM.