University of Macau
Faculty of Science and Technology
PHYS203 – Physics II
Syllabus
1st Semester 2011/2012
Part A – Course Outline

Compulsory course in Civil and Environmental Engineering, Electrical and Computer Engineering and Electromechanical Engineering

Course description:
This is the second part of a calculus-based introductory Physics for student majoring in engineering.

Prerequisite:
PHYS120 – Physics I

Textbook:

- David Halliday, Robert Resnick, Jearl Walker, ***Principles of Physics***, 9 Edition, John Wiley & Sons, Inc., 2011 (ISBN: 978-0-470-56158-4). This textbook has been translated into 29 different languages around the world.

Reference:

- Serway Jewett, Physics for Scientists and Engineers (ISBN: 0-534-42398-1)

Course objectives:

1. to provide the students with a clear and logical presentation of the basic concepts and principles,
2. to strengthen an understanding of the concepts and principles through a broad range of interesting applications to the real world.

Topics covered:

Chapter 21: Electric Charge (Electric Charge, Conductors and Insulators, Coulomb's Law, Charge is Quantized, Charge is Conserved)**,**

Chapter 22: Electric Fields (The Electric Field, Electric Field Lines, The Electric Fields due to a Point Charge; an Electric Dipole; a Line of Charge**;** a Charged Disk, A Point Charge in an Electric Field, A Dipole in an Electric Field),

Chapter 23: Gauss' Law (Flux of an electric Field, Gauss' Law**,** Gauss' law and Coulomb's Law, A Charged Isolated Conductor, Applying Gauss' Law: Cylindrical Symmetry, Planar Symmetry and Spherical Symmetry),

Chapter 24: Electric Potential (Electric Potential Energy, Electric Potential, Equipotential Surfaces, Calculating the Potential from the Field, Potentials due to a Point Charge, a Group of Point Charges; an Electric Dipole; a Continuous Charge Distribution, Calculating the Field from the Potential, Electric Potential Energy of a System of Point Charges, Potential of a Charged isolated Conductor),

Chapter 25: Capacitance (Capacitance, Calculating the Capacitance, Capacitance in parallel and in series, Energy stored in an Electric Field, Capacitor with a Dielectric, Dielectrics and Gauss' Law),

Chapter 26: Current and Resistance, (Electric Current, Current Density, Resistance and Resistivity, Ohm's Law, A Microscopic View of Ohm's Law, Power in Electric Circuits, Semiconductor, Superconductor),

Chapter 27: Circuits ("Pumping" Charges, Work, Energy and Emf , Calculating the Currents in Single-Loop and Multi-loop Circuits),

Chapter 28: Magnetic Fields (Definition of ***B***, Crossed Field: Discovery of the Electron, Hall Effect, A Circulating Charged Particle, Cyclotron and Synchrotron, Magnetic Force on a Current-Carrying Wire, Torque in a Current Loop, The Magnetic Diploe Moment),

Chapter 29: Magnetic Fields due to Currents (Calculating the Magnetic Field Due to a Current, Force between two Parallel Currents, Ampere's Law, Solenoids and Toroids, A Current-Carrying Coil as a Magnetic Dipole),

Chapter 30: Induction and Inductance (Faraday's Law of Induction, Lenz's Law, Induction and Energy Transfer, Induced Electric Fields, Inductors and Inductance, Self-Induction, Energy Stored in a Magnetic Field, Energy Density of a Magnetic Field, Mutual Induction),

Chapter 31: Electromagnetic Oscillations and Alternating Current ((LC Oscillations, The Electrical-Mechanical Analogy, Damped Oscillation in an RLC circuit, Alternating Current, Forced Oscillation, The Series RLC Circuit, Power in Alternating Circuits, Transformers),

Chapter 32: Maxwell's Equations (Maxwell's Equations),

Chapter 33: Electromagnetic Waves (Maxwell's Rainbow, The Travelling electromagnetic Waves, Energy transport and the Poynting Vector, Radiation Pressure, Polarization, Reflection and Refraction, Total Internal Reflection, Polarization by Reflection),

Chapter 34: Images (Mirrors, Spherical Refracting Surface, Thin Lenses, Optical Instruments)

Chapter 35: interference (Young's Interference Experiment, Coherence, Intensity in Double-Slit Interference, Interference from Thin Film, Michelson's Interferenter),

Chapter 36: Diffraction (Diffraction and the Wave Theory of Light, Diffractions by a Single Slit; by a Circular Aperture; by a Double-Slit, Diffraction Gratings, X-Ray Diffraction).

Class schedule and credits:

Timetabled work in hours per week			No of teaching weeks	Total hours	Total credits	No / Duration of exam papers
Lecture	Tutorial	Practice				
5	1	2	14	112	4	1 / 3 hours

Topic outline:

Week	Date	Content	Note
1	8/28 – 9/3	Chapter 21 ， Chapter 22	
2	9/4 - 9/10	Chapter 23 ， Chapter 23/24	
3	9/11 - 9/17	Chapter 24 ， Chapter 25	9/13 holiday
4	9/18 - 9/24	Chapter 26 ， Chapter 27	
5	9/25 - 10/1	Chapter 27/28 ， Chapter 28	
6	10/2 -- 10/8	Holiday, holiday	10/3,10/5,holiday
7	10/9 – 10/15	Chapter 29 ， Test 1	10/12 Test 1 (21 - 27)
8	10/16 - 10/22	Chapter 29/30 ， Chapter 30	
9	10/23 - 10/29	Chapter 30 ， Chapter 31	
10	10/30 - 11/5	Chapter 31/33 ，holiday	11/2 holiday
11	11/6 – 11/12	Chapter 33 ， Test 2	11/9 Test 2 (28 - 31)
12	11/13 - 11/19	Chapter 34 ， Chapter 34	
13	11/20 - 11/26	Chapter 35 ， Chapter 35	
14	11/27 - 12/3	Chapter 36 ， Chapter 36	12/2 last class

Course content:

Maths	Basic Science	Engineering Science	Engineering Design and Synthesis	Complementary Studies	Computer Studies	Total 100%
0	100%	0	0	0	0	100%

Persons who prepared this description:

Prof. Jun Chen

Part B – General Course Information and Policies

1st Semester 2011/2012

Instructor: Prof. Jun Chen Office:
Office Hour: By appointment Phone: (853) 6634 8998
Email: junchen@macau.ctm.net

Time/Venue:

Mondays 11:30 – 13.30 / WLG206
Tuesdays 11:30 – 13:30/HG02, 1 4:30 - 16:30 / WLG206
Wednesdays 8:30 - 10:30 / ILG126, 11:30 – 13:30/ILG129
Thursdays 11:30 – 13:30/JG07
Fridays 11:30 – 13:30/HG02

Assessment:

Final assessment will be determined on the basis of:

Quiz	5%
Test I	20%
Test **I**	25%
Final Exam (3-hour close-book exam):	50%

Grading System:

The credit is earned by the achievement of a grade from 'A' to 'D'; 'F' carries zero credit.

Grades are awarded according to the following system:

Letter Grades	Grade Points	Percentage
A	4.0 (Excellent)	93-100
A-	3.7 (Very good)	88-92
B+	3.3	83-87
B	3.0 (Good)	78-82
B-	2.7	73-77
C+	2.3	68-72
C	2.0 (Average)	63-67
C-	1.7	58-62
D+	1.3	53-57
D	1.0 (Pass)	50-52
F	0 (Fail)	Below 50

Homework Policy:

The completion and correction of homework is a powerful learning experience; therefore:

- There will be a homework assignment for each chapter.
- No homework will be graded, but the quizzes for each week will be based on the homework.

Mid-term Exam:

There is no mid-term exam in this course, but there will be two tests instead. Test I covers the content of Electricity and test II covers the content of Magnetism. Each test takes 100-minute.

Note

- Attendance is strongly recommended.
- No make-up exam is given except for CLEAR medical proof.
- Cheating is absolutely prohibited by the university.