جامعة الإمارات العربيـة المتحدة
United Arab Emirates University

UAEU

Faculty of Science
Department of Physics

Semester   : Spring 2011
Course Title   : Classical Mechanics
Course Number   : PHYS 262
Credit Hours   : 03
Prerequisite   : General Physics I (PHYS-105)
                        & Mathematical Physics (PHYS-255)
                        Or Introduction to Linear Algebra and
                        Differential Equations (MATH-230)

Instructors: Ihab Obaidat (01) and Nacir Tit (sec. 51)

Course Objectives:
1) To develop familiarities with the concepts and methods of classical mechanics.
2) To develop scientific skills in using the physics approach to formulate and solve problems.
3) To develop self-discipline and work habits as useful in both advanced academic courses and the real life.
4) To draw a clear understanding about the boundaries between quantum mechanics and classical mechanics and rules valid in each domain.
5) To enhance the ability of the student for self learning.

Textbook: "*Introduction to Classical Mechanics*", by Atam P. Arya (Prentice Hall, New Jersey, 1990)

References:
- "*Classical Dynamics of Particles and Systems*", 5th Edition by S. Thornton & J. Marion (Brooks/Cole, London, 2004)
- "*Mechanics*", 3rd Edition, by K.R. Symon (Addison-Wesley, London, 1971)
- "*Physics for Scientists and Engineers*", 7th Edition by J. W. Jewett and R.A. Serway (Brooks/Cole, London, 2005).

Internet Resources:
- The blackboard: http://elearning.uaeu.ac.ae/webapps/login/
- Interactive Physics: http://serendip.brynmawr.edu/sci_edu/physites.html#Mech
- Hot to become a good physicist: http://www.phys.uu.nl/~thooft/theorist.html

Homework: Homework will be assigned at the end of each chapter. Homework will be collected in class within one week time after each assignment is announced. Late homework will not be accepted. It is absolutely essential that you work out the assigned problems. If an assignment is copied, completely or in part, everyone involved will be given zero.

Final Examination: There will be a two-hours comprehensive final exam. The date of the final exam is <mark>Saturday, June 11, 2011, at 6 – 8 pm</mark>.

Evaluation Process:
1) Semester Activities   40%
   (i)   Homework Assignments
   (ii)   Quizzes
   (iii)   One Written Report
2) Midterm Exam   20%
3) Final Exam   40%

Possible subjects for the written report:

1) Non-inertial Coordinate Systems (Chapter 11^S)

   <u>Application:</u> Weather Systems

2) Lagrangian and Hamiltonian Dynamics (Chapter 12^S)

   <u>Application:</u> Lagrange's and Hamilton's equations of
   Motion of a single particle

3) Rigid-Body Motion II (Chapter 13^S)

   <u>Application:</u> Symmetrical Top Motion

4) Central Force Motion (Chapter 7^S)

   <u>Application:</u> (i) Perturbed Orbits

   (ii) Orbit Transfer

^{S}Reference= A.P. Araya.

Course Outline:

Chapter No.	Title	Sections	No. of Lectures
1	**Elements of Newtonian Mechanics**	**1.1 - 1.7**	6
2	**Motion of a Particle in One Dimension**	**2.1 - 2.10**	6
3	**Motion of a Particle in Two and Three Dimensions**	**3.1 - 3.15**	10
4	**The Motion of a System of Particles**	**4.1 – 4.8**	6
5	**Rigid Bodies, Rotation about Axis, Statistics**	**5.1 – 5.5**	6
6	**Gravitation**	**6.1 – 6.3**	6
9	**Lagrange's Equation**	**9.1**	2