PHYSICS 2101: Physics for Science and Engineering I

Spring Semester 2010

Instructor: Dr. Awad Gerges

Office: 277 Grigg Hall

Office Hours: MW 6:15 -7:00PM in Burson 135A

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COURSE:

Description: This is the first course of the calculus-based introductory physics sequence. The course covers concepts of linear and circular motions, force, impulse-momentum, work-energy, rotational motion and oscillatory motion. This course is required for most science and engineering majors.

Objectives: To develop students' problem solving skills in a systematic manner, while providing a balance of quantitative reasoning and conceptual understanding.

Assessment: All homework is done online using WebAssign, and counts up to 10% toward students' final grade. Homework's contribution toward final grade is weighted according to one's final exam score.(i.e. if your homework score is 90/100 and your final exam score is is 80/100, then your homework score will contribute 90x10%x80%=8.2 points toward your course grade points. In class daily (paper based) quizzes are graded and count 10% toward students' final grade and WebAssign online quizzes count 5% toward students' final grade.

Students are given two (2) Midterm Exams and one comprehensive Final Exam. Each Midterm Exam is worth 25% and the Final Exam is worth 25% of their final grade.

Learning: Students are encouraged to work together on homework. Working as a part of a study groups is one of the most effective learning tools

available to students

Attending **Supplementary Instructional Sessions (SIS)** is *highly recommended***.**

Physics Department Resource Center is open every MWR from 9am till 5pm and every T from 9am till 8pm at Burson 135A.

For individual free tutoring, visit http://www.ucae.uncc.edu/ University Center for Academic Excellence (Fretwell), Phone: 704 687 2162.

Self Assessment

There will be practice exams (PE) posted in WebAssign a few days prior to each Midterm Exam. Students are encouraged to try these practice exams. These practice exams are meant to act as means of self assessment, and their scores will not affect the final grade what so ever.

There will also be a number of self assessment quizzes (SAQ) posted in WebAssign covering the most recent topics covered in lectures. Once again, the scores for these self assessment quizzes will not affect the final grade what so ever. SAQ's are meant to help students assess their own level of comprehension of the key points of the course.

Math Skills

An operational knowledge of basic college algebra, trigonometry and calculus (differentiation and integration) skills are essential for your success in science and engineering courses. Math Skills references good websites for self assessing your understanding of these topics as requisite for your introductory physics courses. It is highly encouraged that you visit these online math tutorial sites to fortify your grasp of basic math skills. Please make use of the self assessment tools and tutorials within the referenced sites.

MEETING TIMES AND PLACE:

Section 092 meets in Burson 121 MW 5:00 PM – 06:15 PM.

COURSE SCHEDULE:

Refer to the end of this document.

TEXT AND REQUIRED MATERIAL:

- "Physics for Scientists and Engineers", R. Knight. 2nd edition. Available at the bookstore.
- WebAssign Access for online homework. Available at the bookstore or it can be purchased online (http://www.webassign.net/)

ITEMS NEEDED FOR CLASS MEETINGS:

- Pen/pencil and paper
- Calculator

GRADE WEIGHTS:

Homework	up to	10%	All students use WebAssign
Exam I		25%	
Exam II		25%	
In class Quizzes		10%	
Online Quizzes		5%	All students use WebAssign
Final Exam		25%	
TOTAL		100%	

Final Grades are assigned using a 10-point grading scale: A = 90.0-100.0, B = 80.0-89.9, etc.

PLACE AND TIME FOR EXAMS:

MIDTERM EXAMS: Fridays

Midterm Exam I	**February 12**	**930:1100 am**	**Fret 100/113/121**
Midterm Exam II	**Mar 26**	**930:1100 am**	**Fret 100/113/121**

FINAL EXAM:	**Saturday, May 8**	**1500:1730**	**Fret 100/113/121**

THERE ARE NO MAKE UP EXAMS, QUIZZES, OR HOMEWORK. NO EXCEPTIONS; PLAN ACCORDINGLY

CALCULATORS: STUDENTS WILL NEED TO USE A SCIENTIFIC CALCULATOR FOR HOMEWORK, TESTS, AND THE EXAM.

EXTRA INFORMATION AND COURSE POLICIES:

- **YOU ARE RESPONSIBLE FOR ALL MATERIAL COVERED IN CLASS, IN HOMEWORK ASSIGNMENTS, ON QUIZZES, AND IN ASSIGNED READING**.
- ALL CELL PHONES AND PAGERS MUST BE TURNED OFF DURING CLASS AND EXAMS
- LATE HOMEWORK WILL NOT BE ACCEPTED.
- You must completely do your own work on the quizzes and exams. Failure to do so will be a violation of academic integrity. There will be consequences. See Academic Integrity below.
- No wireless electronics devices or laptops are allowed during exams. Students using cell phones, or other wireless communication devices during an exam will have the exam taken up and receive no credit for the exam.

- Students will be required to show their university ID upon turning in exams.

ACADEMIC INTEGRITY:
Please read the Academic Integrity Code http://www.legal.uncc.edu/policies/ps-105.html

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Details on Physics 2101 Requirements

WebAssign: Online Homework System IMPORTANT: DO NOT REGISTER TILL AFTER JANUARY 15th

You must acquire a WebAssign **access code**. You will be doing your homework and quizzes online.
To register you will need the following information:

- Your **username** is the same as your 49er Express username
- Your **institution** is: UNCC
- Then go to:
  http://webassign.net/student.html
  and follow the instructions for self-enrolment on the screen.

  Class code for section 092 is: **uncc 80637249**

  Additional information can be found at
  http://webassign.net/guide/

Academic Integrity

Academic honesty and integrity are essential to the existence and growth of an academic community. Without maintenance of high standards of honesty, members of the instructional faculty are defrauded, students are unfairly treated, and society itself is poorly served. Maintaining the academic standards of honesty and integrity is ultimately the formal responsibility of the instructional faculty; and this responsibility is shared by all members of the academic community. UNC Charlotte strives to create an academic climate in which the dignity of all individuals is respected and maintained. Therefore, we celebrate

diversity that includes, but is not limited to ability/disability, age, culture, ethnicity, gender, language, race, religion, sexual orientation, and socio-economic status.

Students have the responsibility to know and observe the requirements of **The UNCC Code of Student Academic Integrity** (Catalog p. 275). This code forbids cheating, fabrication or falsification of information, multiple submissions of academic work, plagiarism, abuse of academic materials, and complicity in academic dishonesty. Any special requirements or permission regarding academic integrity in this course will be stated by the instructor, and are binding on the students. Academic evaluations in this course include a judgment that the student's work is free from academic dishonesty of any type; and grades in this course therefore should be and will be adversely affected for academic dishonesty. Students who violate the code can be expelled from UNCC. The normal penalty for first offense is zero credit on the work involving dishonesty and further substantial reduction of the course grade. In almost all cases the course grade is reduced to F. Students are expected to report cases of academic dishonesty to the course instructor.

PHYS 2101
Spring 2010 Course Schedule
Dr. Awad Gerges

Topic	Lecture Date
I. Vectors and Coordinate Systems a. Scalars and Vectors b. Properties of Vectors c. Coordinate Systems and Vector Components d. Vector Algebra	Jan 11 *(Chapter 3)*
II. Concepts of Motion a. Motion Diagrams b. The Particle Model c. Position and Time d. Velocity e. Linear acceleration f. Motion in one dimension g. Problem-Solving Strategy h. Units and Significant Figures	Jan 13 *(Chapter 1)*

III. Kinematics in one dimension — Jan 20, 25 *(Chapter 2)*

a. Uniform Motion
c. Instantaneous Velocity
d. Finding Position from Velocity
e. Motion with Constant Acceleration
f. Free Fall
g. Motion on an Inclined Plane
h. Instantaneous Acceleration

IV. Force and Motion — Jan 27 *(Chapter 5)*

a. Force
b. A Short catalog of Forces
c. Identifying Forces
d. What Do Forces Do?
e. Newton's 2nd Law
f. Newton's 1st Law
g. Free-Body Diagrams

V. Dynamics I: Motion along a Line — Feb 1,3 *(Chapter 6)*

a. Equilibrium
b. Using Newton's 2nd Law
b. Mass, Weight and Gravity
a. Friction
b. Drag
c. Examples of Newton's 2nd Law

VI. Dynamics II: 2D Motion — Feb 8, 10 *(Chapter 4.1 – 4.4, Chapter 8.1)*

a. Acceleration
b. Kinematics in two Dimensions
b. Dynamics in two Dimensions
c. Projectile Motion
d. Relative Motion

Exam I — **Feb 12**

VII. Dynamics III: Circular Motion — Feb 15, 17, 22
(Chapter 4.5 – 4.7, Chapter 8.2 – 3, 8.6 - 7)

a. Uniform Circular Motion
b. Velocity and Acceleration in Uniform Circular Motion
c. Dynamics of Uniform Circular Motion
d. Non-uniform Circular Motion and Angular Acceleration

VIII. Newton's Third Law — Feb 24 & Mar 1, 3 *(Chapter 7)*

a. Interacting Systems
b. Identifying Action/Reaction Pairs
c. Newton's third Law
d. Ropes and Pulleys
e. Examples of Interacting System Problems

IX. Impulse and Momentum — Mar 15,17, 22, 24 *(Chapter 9)*

a. Momentum and Impulse
b. Solving Impulse and Momentum Problems
c. Conservation of Momentum
d. Explosions
e. Inelastic Collisions
f. Momentum in two Dimensions
g. Angular Momentum

Exam II **Mar 26**

X. Energy — Mar 29, 31 *(Chapter 10)*

a. Kinetic Energy
b. Gravitational Potential Energy
c. Restoring Forces and Hooke's Law
d. Elastic Potential Energy
e. Elastic Collisions

f. Energy Diagrams

XI. Work — Apr 5, 7 *(Chapter 11)*

a. The Basic Energy Model
b. Work and Kinetic Energy
c. Calculating and Using Work
d. Work Done by a Variable Force
e. Force, Work, and Potential Energy
f. Finding Force From Potential Energy
g. Thermal Energy
h. Conservation of Energy
i. Power

XIII. Rotation of Rigid Body — Apr 12, 14, 19, 21 *(Chapter 12)*

a. Rotational kinematics
b. Rotation about the Center of Mass
c. Torque
d. Rotational Dynamics
e. Rotation about a Fixed Axis
f. Rigid-Body Equilibrium
g. Rotational Energy
h. Rolling Motion
i. Vector Description of Rotational Motion
j. Angular Momentum of a Rigid Body

XIV. Oscillations — Apr 26, 28 & May 4 *(Chapter 14)*

a. Simple Harmonic Motion
b. Analogy to Circular Motion
c. Energy in Simple Harmonic Motion
d. Dynamics of Simple Harmonic Motion
e. Vertical Oscillations
f. The Pendulum
g. Damped Oscillations

Reading Day May 5

Final Exam (Comprehensive) – May 8

Good Luck